

San Francisco Bay Coastal Management Program Assessment and Strategy

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Of the federal Coastal Zone Management Act
For the Office of Ocean and Coastal Resource Management,
National Ocean and Atmospheric Administration,
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By

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Restoring San Francisco Bay Wetlands



Building Your Foundation on Bay Water

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Summary

Background

Since 1977, the San Francisco Bay Conservation and Development Commission has received financial assistance from the National Oceanic and Atmospheric Administration (NOAA) under the provisions of the federal Coastal Zone Management Act (CZMA) to implement BCDC's coastal management program for San Francisco Bay. When Congress reauthorized the Coastal Zone Management Act in 1990, it added a new section 309 to establish a voluntary coastal zone enhancement grant program.

The Section 309 program encourages states to develop innovative approaches for addressing the following nine coastal issues that Congress found to be of national significance: (1) public access; (2) coastal hazards; (3) ocean resources management; (4) wetlands protection and restoration; (5) cumulative and secondary impacts of development; (6) marine debris; (7) special area management planning; (8) energy and government facility siting; and (9) aquaculture.

To be eligible for funding, state coastal management agencies are required to periodically conduct an assessment of their programs, assign a ranking to areas where the program could be improved, and prepare a strategy of priority program enhancements corresponding to one or more of the nine coastal issues. The assessment and strategy is submitted to NOAA for review and ranking for funding eligibility. This document contains the draft assessment of BCDC's coastal management program for San Francisco Bay and a proposed strategy of priority program enhancements through 2010.

Assessment and Strategy

The process for assessing BCDC's coastal management program and developing a strategy for improving the program was carried out in concert with BCDC's strategic planning process. During three workshops, BCDC's staff, the public and the Commissioners contributed to defining BCDC's proposed program enhancements. During a staff workshop on May 11, 2005, the staff identified current and future Bay-related issues as well as objectives to improve BCDC's program to better address the issues. On August 15, 2005, the staff held a public workshop where the issues and objectives identified by the staff were discussed and additional objectives were identified. These issues and objectives were presented to the Commission and prioritized during the Commission's strategic planning workshop on September 15, 2005. BCDC's program achievements during the past five years, the current and future issues, and the Commission's priority program improvements are summarized below and described in detail in the body of this Assessment and Strategy for 2005 through 2010.

Based on the program assessment, five enhancement areas ranked as *high priority* for improving BCDC's coastal management program to address the nine national coastal issues. Program changes were identified and synthesized into a strategy to improve the Commission's coastal program and allow the Commission to better address the nationally important issues of (program change #1) wetlands protection and restoration, (program change #2) coastal hazards, (program change #3) energy and government facility siting, (program change #4) cumulative and secondary impacts, and (program change #5) public access. The results of the assessment and the high priority program changes are summarized in the following pages.

Enhancement Area #1: Wetlands Program. Program objectives address the need to protect, restore and enhance existing coastal wetlands or to create new wetlands. Commission efforts to control filling have nearly halted further conversion of Bay wetlands, and where the Commission has permitted fill for legally allowed uses, the mitigation conditions required by the Commission as a condition for permits have resulted in the creation of considerably more tidal wetlands than were filled.

The program assessment demonstrated a need to plan, support, and regulate large scale wetland restoration as well as to expand protection of wetland resources by:

- Updating the San Francisco Bay Plan managed wetlands policies to reflect current scientific knowledge, particularly in light of the current movement toward restoring the Bay and the growing demand for Bay mitigation sites to offset effects of development in the region (p. 28).
- Expanding the understanding of the sediment budget and sediment transport as it relates to large-scale wetland restoration in the Bay (p. 29-30).
- Broadening the scope of information and the understanding regarding the value of Bay's natural and economic resources, especially relating to sediments (p. 29).
- Updating the *San Francisco Bay Plan* (Bay Plan) policies pertaining to subtidal areas, resource extraction, and sediments by continuing to serve as a member of the administrative core group for the Subtidal Habitat Goals Project. The Subtidal Goals Project is providing an opportunity for research and a forum for discussion of scientific information on subtidal issues, especially issues related to the storage and transport of sediment, extraction of mineral resources, and identifying the functions and values of subtidal habitats (p. 29-30).
- Expanding communication with scientists and incorporate scientific review into all Commission processes (p. 31-32).
- Continuing to participate as a partner in assessing regional data needs and developing information for the Central California Ocean Observing System (p. 32).
- Continuing to participate in the South Bay salt pond planning process and the Hamilton wetland restoration project, as well as the planning for other large-scale restoration efforts (p. 27, 30-31).

Wetlands Program Improvements: Proposed Strategies. The Commission should expand protection of the Bay's wetlands and foster wetland restoration programs through refining its Bay Plan policies pertaining to subtidal habitats and managed wetlands.

- **Subtidal Habitats and Mineral Resources.** As part of its effort to develop and implement a comprehensive program for the sustainable use, restoration and conservation of the Bay's subtidal resources, the Commission should update the Bay Plan findings, policies and map designations pertaining to subtidal areas, including sand and shell extraction, sediment movement in the Bay, and function and value of subtidal habitats. Modeled on the highly successful Baylands Ecosystems Habitat Goals Project, the appropriate policy revisions would emerge from a comprehensive, cooperative, interagency, science-based Subtidal Habitat Goals Project.

Bay Area decision-makers are increasingly asked to make decisions that affect subtidal habitats, which requires critical, missing information and policy guidance regarding the subtidal environment, such as the following: (1) the relative importance of subtidal habitats (e.g., do we need more shallow water versus deep water habitats?); (2) appropriate restoration techniques (should shallow water habitats be restored with dredged materials or by returning areas diked from the Bay to tidal action?); (3) the

appropriateness of large-scale fill for subtidal habitat improvement and the affect on hydrodynamics, bathymetry, and substrata; (4) a full understanding of the threats to these habitats; and (5) the dynamics between water quality or freshwater inflow and subtidal habitats.

- **Managed Wetlands Policies.** As part of its effort to develop and implement a comprehensive program for the use and restoration of Bay resources, the Commission should update the Bay Plan and the *Suisun Marsh Protection Plan* (Suisun Marsh Plan) findings, policies and map designations pertaining to managed wetlands. The managed wetlands findings, policies and map designations need to be updated to incorporate new information regarding: (1) managed wetland habitat values; (2) the location of managed wetlands; (3) land managed approaches undertaken by private duck clubs responsible for maintaining some managed wetlands; (4) restoration or management objectives proposed by public agencies responsible for maintaining other managed wetlands; and (5) possible conversion of some managed wetlands to tidal and subtidal habitat.
- **Science Integration.** Permit evaluations for projects in the Bay increasingly require coordination between the staff and the scientific community to assess the potential impacts of projects and minimize harmful affects to Bay wetland resources as required in the McAteer-Petris Act. There is a need to evaluate ways to expand communication with scientists and incorporate scientific review into all Commission processes, especially within the tight permitting timelines. Therefore, the objective of this project is to improve scientific review of project proposals during the permit process by developing more expansive and consistent communication with scientists. This could involve any of the following methods of implementation: create a science advisory panel similar to the Commission's Design Review Board or Engineering Criteria Review Board; set up science seminars for BCDC staff; expand BCDC's role in the Wetlands Design Review Group (WDRG); and evaluate whether policies are needed to support the use of scientific review in permit processing and, if needed, develop new Bay Plan policies.

Enhancement Area #2: Coastal Hazards. Program objectives address the need to prevent or significantly reduce threats to life and destruction of property by controlling development and redevelopment in high hazard areas, managing development in other hazard areas, and anticipating and managing the effects of potential sea level rise. BCDC has been recognized as a national leader in addressing coastal hazards, particularly in seismic safety and sea level rise.

The program assessment confirmed a need to take steps to better prepare for and manage coastal hazards, such as:

- Secure a full-time, permanent position for a staff engineer to review engineering details on project proposals, prepare proposals new Bay fill for review by the Engineering Criteria Review Board, review Caltrans project proposals, and review project proposals for compliance with engineering plans (p. 35).
- Assess the impacts of global climate change on the Bay and create a mechanism to inform stakeholders about the impacts and lead a regional effort to address the impacts. Update the relevant policies in the Bay Plan pertaining to the impact of global climate change, such as relative sea level rise (p. 37).
- Identify the major issues BCDC could confront following a disaster and how BCDC can best work with other agencies to prepare for disasters. Update the policies in the Bay Plan pertaining to safety of fills and shoreline protection and develop new policies on disaster preparedness, where appropriate (p. 38-39).

Coastal Hazard Program Improvements: Proposed Strategies. The Commission should improve its coastal management program by working cooperatively with local governments to ensure that development in shoreline areas incorporates current safety standards through such avenues as:

- **Global Climate Change.** Overall, global temperatures are rising and are predicted to continue to rise for the foreseeable future. Global climate change is expected to have significant impacts on the State of California. As temperatures increase, the state will possibly experience changes in precipitation and earlier snowmelt in the Sierra Nevada. Coupled with projected population increase and growth in the California Central Valley, temperature increases can significantly alter the already strained supply of water for agricultural and municipal uses throughout the state. Changes in California's water supply would ultimately alter the volume of fresh water inflow to the Bay, thereby impacting the Suisun Marsh, water circulation throughout the Bay, species composition, sedimentation rates and distribution, and marsh restoration activities. In addition to issues surrounding water supply, Bay Area residents and Bay natural and economic resources must be protected from the impacts of accelerated, relative sea level rise in the Bay. Historical records show that sea level in San Francisco Bay has risen nearly 18 cm (7 inches) over the past 150 years. However, in the next 100 years, sea level is predicted to rise up to three feet in the Bay.

As part of its effort to improve its coastal hazards program by working cooperatively with stakeholders to address the impacts of human-induced climate change on Bay resources and shoreline development, the Commission should update the Bay Plan findings and policies pertaining to sea level rise and other adverse impacts of climate change. This would be accomplished in a three-phased project, through which the Commission would do the following: (1) conduct extensive research on human-induced climate change and coordinate with other planning bodies and scientists to identify the major impacts on the Bay and associated issues; (2) inform local governments, stakeholders, and the public in the Bay Area regarding the potential impacts of and approaches to planning for human-induced climate change and develop a regional planning approach for addressing the impacts of climate change on Bay resources; and (3) update the policies in the Bay Plan to account for new information about the far reaching impacts of human-induced climate change on the Bay, including, but not limited to, accelerated, relative sea level rise.

- **Disaster Preparedness.** As part of its effort to improve its coastal hazards program by working cooperatively with government agencies to address the impacts of disasters on Bay resources and shoreline development, the Commission should update the Bay Plan findings and policies pertaining to shoreline protection and safety of fills. Multiple agencies are involved in planning and preparing for disasters in the state as well as the region. There is a great need to identify the major issues BCDC could confront following a disaster and how BCDC can best work with other agencies to prepare for disasters. It is essential to coordinate with the agencies involved in disaster planning in order to protect Bay natural and economic resources to the maximum extent feasible during and after a disaster. This coordinated effort would lead to better disaster planning, updates to the policies in the Bay Plan pertaining to safety of fills and shoreline protection, and new policies on disaster preparedness where appropriate, such as the Bay Plan sections on airports, sea ports, and water-related industry.

Enhancement Area #3: Energy and Government Facility Siting. Program objectives address the need to adopt procedures and enforceable policies to help facilitate the siting of energy facilities, energy-related activities and government activities that may be of greater than local significance. Through the priority use designations in the Bay Plan, the Commission has ensured that shoreline areas needed for ports, airports, and water-related industries, such as oil refineries, have not been preempted by other land uses that can be accommodated elsewhere.

The program assessment showed that the Commission should refine its policies and pursue planning efforts to address issues related to energy and government facility siting in critical areas such as:

- Expanding BCDC's work with the Regional Airport Planning Committee—the Metropolitan Transportation Commission, the Association of Bay Area Governments, the Federal Aviation Administration and local airports—to ensure that BCDC's policies reflect current information on the aviation industry in the Bay Area, consistent with the *Regional Airport System Planning Analysis* (p. 42-43, 45).
- Working with the California Energy Commission to assess the specific needs for petroleum infrastructure expansion in the Bay Area and update the Bay Plan findings, policies, and priority use area designations pertaining to water-related industry (p. 42).
- Continuing to monitor cargo throughput in Bay Area ports and produce cargo monitoring reports so that the *San Francisco Bay Area Seaport Plan* (Seaport Plan) can be kept up to date (p. 43).
- Continuing to protect Bay resources by providing a full-time staff position to work on oil spill prevention and response in collaboration with the state Office of Oil Spill Prevention and Response (p. 44).

Energy and Government Facility Siting Program Improvements: Proposed Strategies. The Commission should improve its program for facilitating the siting of energy facilities and energy-related activities and government activities while maintaining current levels of coastal resource protection through refining its Bay Plan policies, such as by addressing:

- **Airport Planning.** By expanding BCDC's ongoing work with the Metropolitan Transportation Commission, the Association of Bay Area Governments, the Federal Aviation Administration and local airports to address an apparent future need for expanded airport capacity in the Bay Area, the Commission will ensure that BCDC's airport policies reflect current information on the aviation industry in the Bay Area, consistent with the RASPA. It is critical that the Bay Plan findings, policies and priority use area designations reflect and respond to these changes in air travel and cargo demands, while protecting Bay natural resources and assuring that, if fill is proposed for airport facilities, the fill is needed, there are no alternative upland locations, and the fill is placed to minimize adverse environmental impacts on the Bay. BCDC can maximize its time and effort in updating the RASPA, either as the lead or as one of the central agencies in RAPC, by updating the Bay Plan airport policies in conjunction with the RASPA work. The update of the Bay Plan policies continues to be important, especially with the changes in aviation industry security and demand since the 2000 RASPA amendment.
- **Water-Related Industry.** The Commission should improve its program for facilitating the siting of energy facilities and energy-related activities through refining its Bay Plan findings, policies, and priority use area designations pertaining to water-related industry. The Commission can work with the CEC, OSPRA, and the State Lands Commission to assess the specific needs for petroleum infrastructure expansion in the Bay Area and supplement the contents of the CEC's 2007 Integrated Energy Report

with this relevant information. Through this partnership, the Commission would benefit from the CEC's expertise in projecting energy demand and supply when updating the findings, policies, and priority use area designations pertaining to water-related industry.

Enhancement Area #4: Cumulative and Secondary Impacts. Program objectives address the need to develop and adopt procedures to assess, consider and control cumulative and secondary impacts of coastal growth and development, including the collective effect of various individual uses or activities on coastal resources, such as coastal wetlands and fishery resources. BCDC was formed to deal with the cumulative impacts of Bay filling that was being undertaken to accommodate unrestricted growth. Inland development activities continue to generate pressure to place Bay fill and increase demands for public access to the Bay.

Through the program assessment the Commission recognized its successful track record in partnering with other agencies, interest groups and the public to better coordinate and manage planning efforts important to the Bay region. These partnerships should continue and could be pursued to address cumulative and secondary impacts of development in a number of ways, including:

- Promoting and facilitating greater regional collaboration between agencies and organizations that protect Bay resources from cumulative and secondary impacts of growth and development, such as by engaging in regional strategic planning efforts (p. 52).
- Continuing the Commission's important work on non-point source pollution, especially through the Critical Coastal Areas Committee (p. 55).
- Working with the scientific community, resource agencies—notably the Regional Water Quality Control Board, the State Water Resources Control Board, Department of Water Resources, the Department of Fish and Game, U. S. Fish and Wildlife Service, National Marine Fisheries Service, the U. S. Environmental Protection Agency, and CALFED Bay-Delta Program—to refine Bay Plan policies that address water quality, fresh water inflow, water surface area and volume (p. 56-57).
- Coordinating with efforts such as CALFED, the San Francisco Bay Joint Venture, San Francisco Estuary Project and the Coastal Conservancy to promote habitat restoration planning and implementation for Bay aquatic and wildlife species including endangered species, thereby contributing to the enhancement of natural resources lost as a result of growth and development in the San Francisco Bay Area (p. 58).
- Increasing the Commission's involvement with public agencies and non-government organizations striving to address threats to the health of the Bay ecosystem presented by invasive non-native plant and animal species (p. 59).
- Combining BCDC's text-based Permit Tracking System (PTS) and its geographic information system (Bay Resource Analysis Tool (BayRAT)) and making minor modification to generate the performance indicator information required by NOAA (p. 60).
- Regionwide planning as a tool to balance shoreline and Bay fill development with protecting Bay resources, particularly projects that have the potential to impact large areas of the Bay (p. 53).

Cumulative and Secondary Impacts Program Improvements: Proposed Strategies. The Commission should develop policies and programs to address impacts to the Bay created by growth and development by building on its successful track record in collaborating with agencies, interest groups and the public to better coordinate and manage planning efforts important to the Bay region. These efforts could be pursued in a number of ways, including:

- **Fresh Water Inflow.** As part of its effort to develop and implement a comprehensive program that addresses cumulative and secondary impacts of growth and development, the Commission should update the Bay Plan policies on fresh water inflow. The Bay Plan policies on fresh water inflow have not been updated since 1982, long before the CALFED process was initiated. Because the amount of fresh water that enters the Bay through tributaries affects the overall species composition and geomorphology of the Bay, there is a need to evaluate the fresh water inflow policies in the Bay Plan and develop a work program to update the findings and policies to: (1) incorporate new information about the role of fresh water in the Bay; (2) incorporate new information about the impacts of global climate change on fresh water supply and potential diversions; and (3) to analyze and address recent CALFED decisions and initiatives and incorporate information pertaining to BCDC's jurisdiction.
- **Water Surface Area and Volume.** As part of its effort to develop and implement a comprehensive program that addresses cumulative and secondary impacts of growth and development, the Commission should update the Bay Plan findings and policies pertaining to water surface area and volume. The water surface area and volume findings and policies need to be updated to: (1) incorporate new information about the important relationships between water surface area and volume, water circulation, fresh water inflow, bathymetry, and water pollution (2) recognize the potential impacts of global climate change on the chemical and hydrological functions of water surface area and volume; and (3) provide clear policy guidance for the extensive areas of the Bay planned for restoration.
- **Invasive Species.** The Bay is considered the "most invaded Estuary in the world." The cumulative impacts of introduced invasive species are the primary threat to the Bay's biodiversity, with new species introduced at a rate of one every twelve weeks. BCDC should further improve its program by addressing the cumulative and secondary impacts of growth and development by updating the Bay Plan findings and policies pertaining to invasive species. BCDC should develop an invasive species program that includes the following: (1) analyzing the existing invasive species programs of other organizations to determine how BCDC can best assist in the effort to stop the introduction of invasive species; (2) analyzing the Bay Plan policies pertaining to invasive species and potentially developing new Bay Plan policies; and (3) developing a coordinated approach to advocating and providing education on invasive species issues.
- **Data Systems and Performance Indicators.** The Commission can further improve its program on cumulative and secondary impacts of growth and development by merging two data systems—PTS and BayRAT—to provide 40 years of detailed permit data in a GIS and enable the Commission to generate data in response to NOAA's performance indicator requirement. Merging PTS and BayRAT would require additional input of past permit actions and minor modifications. Additional modifications, although minor, would also be required to generate data for performance measures. However, the data generated from a combined data system would not only be useful for NOAA's performance indicator program, but for securing state general funds and support for BCDC's program from the state legislature.

Enhancement Area #5: Public Access Program. Federal enhancement objectives for state coastal management programs address the need to increase opportunities for public access to coastal areas, and include providing access while protecting wildlife, particularly endangered species. BCDC's program continues to increase opportunities for public access to the Bay and shoreline and remains a model for other public access efforts.

The program assessment concluded that substantial changes were implemented to improve its public access program from 2001-2005. However, to further its program to increase public access to the Bay, the Commission could explore new ways to improve public access and refine its policies related to public access, through such avenues as:

- Updating the *Bay Shoreline Landscape Guide: Planting Material and Methods for San Francisco Bay Shoreline Projects* with a comprehensive set of planting guidelines that address numerous shoreline settings and with new information and important trends in landscape planting along the shoreline (p. 65-66).
- Developing recommendations on policies, criteria, and guidelines for appropriate location, design, operation and maintenance of the proposed Bay Water Trail (p. 66-67).
- Expanding the Shoreline Access Website by partnering with the California Coastal Conservancy to add information from *The Bay Shoreline Guide* (p. 67).
- Participating in the implementation of stakeholder processes to address public access opportunities and challenges presented by large-scale restoration projects (p. 32, 65).

Public Access Program Improvements: Proposed Strategies. To further its program to improve public access to the Bay, the Commission should explore ways to increase public access and refine its policies related to public access, through such avenues as:

- **The Shoreline Landscape Guide.** The Commission should improve its public access program by updating Shoreline Landscape Guide to include a comprehensive set of planting guidelines that address the numerous shoreline settings that are present along the San Francisco Bay. The original guide was created in 1984 with financial assistance from OCRM. Since the plan was created, new information has emerged and important trends have evolved. Depending on the situation and location, effective shoreline landscaping can contribute to attractive public access trail experiences, can minimize adverse effects of public access on wildlife through the use of design techniques such as landscape buffers, and can create upland habitat for wildlife. The Commission should update the Shoreline Landscape Guide to include the following: (1) a revised list of appropriate shoreline plants for various situations, with an emphasis on natives; (2) an up-to-date list of plant sources; and (3) planting principles for the zone between tidal areas and adjacent development.

The Commission determined the following area to be of *medium priority* for improving the Commission's management program for the Bay.

Enhancement Area #6: Special Area Management Planning. Program objectives address the need to prepare and implement special area management plans for important coastal areas. Special area management planning is an effective way to eliminate inconsistencies between the plans and policies of different agencies having regulatory jurisdiction over the same areas or issues, to provide greater regulatory certainty and predictability, and to deal with emerging issues such as public access, nonpoint pollution control, wetland management and cumulative impacts of development. BCDC has been a pioneer in developing special area management plans with local governments and other agencies.

BCDC should build on its proven success in joining with local jurisdictions and non-government organizations to foster greater coordination in developing policies and land use planning for the Bay and shoreline through such special area planning programs as:

- Suisun Marsh Local Protection Program updates, such as the Suisun Resource Conservation District's efforts to update all 158 duck club management plans to be consistent with current State Fish and Wildlife requirements (p. 74).
- Waterfront planning efforts, such as the southern waterfront in San Francisco, to coordinate local goals with the McAteer-Petris Act and Bay Plan (p. 73).

Special Area Management Planning Program Improvements: Proposed Strategies. The Commission can build on its proven success in joining with local jurisdictions and others to foster greater coordination in developing policies and land use planning for the Bay and shoreline through such special area planning programs as:

- **Suisun Marsh Planning.** The Suisun Resource Conservation District (SRCD) and the Commission want to update the duck club management plans to reflect current duck club management practices in the marsh and to create a comprehensive GIS data base that describes all water control structures and other improvements on the clubs. Such improvements will improve communications between the clubs and the SRCD and between the SRCD and the Commission. The Commission will ensure that the new plans include current best management practices, and will conserve plant, fish and wildlife species in the marsh, consistent with the requirements of the Suisun Marsh Preservation Act, and the Suisun Marsh Preservation Plan.
- **San Francisco Southern Waterfront.** BCDC and the Port of San Francisco need to plan for potential development impacts that will affect the southern waterfront. The 2000 amendments to the San Francisco Waterfront Special Area Plan provide an excellent example of a successful collaborative planning process between the Port and BCDC that has reduced conflicts and improved project review and policy implementation. BCDC and the Port should continue their partnership by updating the policies pertaining to the area south of China Basin, which features the City's remaining maritime cargo shipping facilities, and is currently facing proposals for non-maritime mixed use development.

The Commission concluded the following to be of *lower priority*.

Ocean Resources, Marine Debris and Aquaculture. These areas were found to be of low priority for the purposes of this assessment because the primary authority to address ocean resources or to avert impacts from marine debris rests with agencies other than BCDC. Finally, the Bay does not afford a marine environment conducive to aquaculture activities.

Introduction

BCDC's Coastal Management Program

The Commission is designated by the California McAteer-Petris Act as the agency responsible for maintaining and carrying out the provisions of the Act and the *San Francisco Bay Plan* (Bay Plan) for the protection of the Bay and its natural resources, and for the development of the Bay and shoreline to their highest potential utilizing a minimum of Bay fill. The Commission regulates filling and dredging activities in its jurisdiction of all areas of San Francisco Bay subject to tidal action (to the mean high tide line including marshlands up to five feet above mean sea level), which includes San Pablo, Suisun and other bays, sloughs and certain creeks and tributaries that are part of the Bay system, salt ponds and specified areas that have been diked off from the Bay. BCDC regulates development within the first 100 feet inland from the Bay to ensure that maximum feasible public access to the Bay is provided and

that key shoreline areas are reserved for regionally important high priority uses. The Commission is directed to protect Suisun Marsh, the largest remaining wetland in California, by administering the Suisun Marsh Preservation Act in cooperation with local governments. In addition, the Commission is directed to pursue an active planning program to study Bay issues so that Commission plans and policies are based upon the best available current information.

To protect the shoreline and the waters of San Francisco Bay to the maximum extent possible, the Commission issues or denies permits for any proposed project that involves placing fill, extracting materials or making any substantial change in use of any water, land or structure within the area of the Commission's jurisdiction. The McAteer-Petris Act and Bay Plan allow only the minimum Bay fill necessary for specified water-oriented projects or minor amounts for necessary shoreline improvement or public access. Fill is defined by the Act as any substance or material placed in any area subject to tidal action, including any pilings or structure on pilings or cantilevered over the Bay, or any structure moored in the Bay for extended periods of time. Filling of the Bay and certain waterways specified under the Commission's jurisdiction is authorized only when public benefits clearly exceed public detriment from the loss of water areas and when no alternative upland location is available for the proposed project. The nature, location and extent of any fill must be such that it will minimize harmful effects to the Bay as a whole, such as the reduction or impairment of the surface area or circulation of water, water quality, fertility of marshes or of fish and wildlife resources. Further, the public health, safety and welfare require that fill be constructed with sound safety standards that will afford reasonable protection to persons and property against the hazards of unstable geologic or soil conditions or of flood or storm waters.

The McAteer-Petris Act directs the Commission to carry out its regulatory program in accordance with the provisions of the Bay Plan, which guide the protection and development of the Bay and its marshes, managed wetlands, salt ponds, and shoreline. The Bay Plan includes policies on issues critical to the wise use of the Bay ranging from ports and public access to fish and wildlife. Integral to the Bay Plan are the Plan maps, which encompass the entire Bay region. The areas under the jurisdiction of the Commission are broadly delineated, as are areas reserved for priority uses. Certain water-oriented land uses along the Bay shoreline found to be essential to the public welfare of the region are specified in the Act: ports, water-related industries, airports, wildlife refuges and water-oriented recreation and public assembly are included among the water-oriented uses. The Commission makes provision for adequate and suitable shoreline locations for these uses, thus minimizing the necessity for future filling of the Bay to create new areas for these uses. Development of priority use areas is governed by the Bay Plan policies that apply for each specific use.

Development of shoreline areas not reserved for priority use is limited to projects that provide maximum feasible public access consistent with the project. In order to provide the maximum opportunity for public enjoyment of the Bay and its shoreline, the Commission's jurisdiction over a shoreline band 100 feet landward and parallel to the edge of the Bay provides BCDC with the authority to require that "maximum feasible public access, consistent with the proposed project, to the Bay and its shoreline" be a part of every new shoreline development project.

The Commission is further charged with administering the federal Coastal Zone Management Act for the San Francisco Bay segment of the California coastal zone. The CZMA encourages coastal states and territories to develop and implement programs to manage the nation's coastal resources. BCDC's management program is based on the provisions and policies of the McAteer-Petris Act, the Suisun Marsh Preservation Act of 1977, the Bay Plan, the *Suisun Marsh Protection Plan* (Suisun Marsh Plan) and the Commission's administrative regulations. Federal agencies are generally required to carry out their activities and programs in a manner consistent with the Commission's management program and proposed projects are subject to consistency determinations by the Commission.

Summary of Past 309 Efforts

Since 2001, with the assistance of Coastal Zone Management Act, Section 309 funding, the Commission has implemented three major program changes with a fourth program change due to be completed in December 2005. Those projects are described in detail below.

Thermal Power Plant Siting Study

The purpose of this project was to: (1) identify sites within the jurisdiction of the Commission where the location of a thermal power plant and ancillary facilities would be inconsistent with the provisions of BCDC's laws and policies; (2) prepare a report to the Commission; and (3) hold a public hearing on the report and adopt the report. Staff identified the sites, prepared the report, the Commission held a public hearing on November 17, 2002 and on December 5, 2002, adopted the report.

Project Objectives. The objectives of the Thermal Power Plant Siting Study project were to:

- Conduct research and analysis and prepare a background report that describes BCDC's role in siting power plants, provide information regarding California's energy resources, explain the process of energy provision before and after deregulation and describe the factors that contributed to the energy crisis experienced in 2000 and the potential impacts of the crisis on the San Francisco Bay.
- Ensure that adequate and appropriate sites for thermal power plants are available along the shoreline of the Bay and that inappropriate sites are identified, such as those areas that contain sensitive resources and/or would create a conflict with a priority land use designation identified in BCDC's Bay Plan.
- Update the natural and cultural resource information on the existing paper U.S.G.S. Quad Sheet Thermal Power Plant Siting Study maps and convert these maps into a digital format and enter that information into a BCDC power plant siting geographic information system (GIS). Develop a series of digital maps that will depict the areas where the location of power plants would be inappropriate due to conflicts with natural and/or cultural resources.
- Re-write and re-format the Thermal Power Plant Siting Study by re-writing and re-formatting the document to make it more clear and concise. The re-write will reduce the length, add a better format and graphics that clarify confusing passages to make the document more useful to staff, applicants and the public.

Project Accomplishments. The objectives were achieved by completing the following tasks:

- **Re-write and Re-format the Power Plant Report.** The Power Plant Report was completely re-written and re-formatted to provide more information, to clarify existing information and to make the report more user-friendly. The designations of where a power plant or associated ancillary facilities may not be sited was revised to reflect the concerns of the California Energy Commission and BCDC staff. These changes included allowing for the consideration of ancillary facilities in areas where there would not be impacts to Bay resources and for the consideration of power plants on industrial port and airport lands where the siting of such a facility would not impede the use of the site for its primary function. Additionally, it was determined that these designations should be developed as a regulation (an addition to the California Administrative Code) to ensure that they were enforceable and properly implemented.

The report also added a Summary and Conclusions section to make it easier for staff and the public to use. This section summarizes all of the key conclusions in the report and identifies those areas where power plants may not be sited due to the potential for impacts to Bay resources. This section includes a set of conclusions that identify the key findings of the report and the conclusions that flow from these findings. For example, the analysis for the project showed that power plants no longer require a

shoreline location, due to changes in both power plant and power plant cooling technology. Therefore, the report concludes “[p]ower plants no longer require shoreline locations except in areas where power supply is inadequate, transmission capacity is constrained, an alternative water supply unavailable or where the use of all alternative technologies would result in greater adverse environmental impacts.” In these cases once-through cooling may be the only cooling technology available. However, in most cases, other technologies, such as wet, hybrid, or dry, could constitute a feasible alternative to a once-through cooling system which requires fill in the Bay. In such cases, BCDC is required by the McAtter-Petris Act Government Code Section 66600-66681) to recommend against the project and recommend the use of an alternative technology that does not require fill in the Bay.

The updated report also includes a set of submittal recommendations to assist project proponents with submitting the information that the Commission needs to make a recommendation to the California Energy Commission as required by the McAtter-Petris Act. Additionally, the updated report includes the seven maps that illustrate where thermal power plants and ancillary facilities should not be sited.

- **Convert Paper Maps to a Digital Format.** The conversion of the original power plant siting maps has been successfully completed and the staff has been trained to use the system. Scripts were written for the system that allows staff to quickly identify the resources at a proposed site and whether or not a power plant may be considered at the site. A map template was also created to allow staff to make exhibits of the information or for presentation purposes at meetings.
- **Produce a revised Power Plant Report and a Suite of Digital maps.** The staff prepared a draft Power Plant Report, Siting and updated and digitized all of the required information for the Power Plant Maps, which accompany the report and identify those locations where a power plant may not be sited within BCDC’s jurisdiction. The draft of the report was reviewed by key interested parties such as the California Energy Commission staff, and by Commission staff. Based on these reviews, revisions were made to the draft and the final staff report, Siting Thermal Power Plants in the Jurisdiction of the San Francisco Bay Conservation and Development Commission, dated October 25, 2002, was prepared. The Commission determined that the power plant siting report and the maps should be accompanied by a Commission regulation, which would be used to implement the report and the maps. A proposed regulation, Regulation Section 11021, was prepared by staff and circulated per the requirements of the State Administrative Procedures Act. The Commission held a public hearing on November 7, 2002 on the power plant siting report and the Regulation 11021. On December 5, 2002 the Commission approved the power plant siting report and the associated maps. In addition, in a separate action, the Commission approved Regulation 11021.

The report includes current information on technology, supply and demand in California, the regulatory process, information to assist staff in reviewing power plant proposals and the environmental impacts associated with power plants. In addition, the report increases the clarity of the information by rewriting significant portions of the report, including graphics and reformatting the document. The regulation was reviewed and approved by the California Office of Administrative Law in April 2003.

Bay Research and Analysis Tool

The objectives of the Bay Research and Analysis Tool (BayRAT) project were to:

- Identify, obtain, configure, and distribute geographic and tabular information to expand the analysis and research capabilities of BCDC staff. The purpose of this expanded research is to enable BCDC to better manage the San Francisco Bay segment of the coastal zone.

- Design and implement a pilot project (the Bay Research and Analysis Tool) using the Environmental Systems Research Institute (ESRI) ArcView Integrated Management Server (ArcIMS) software. This pilot project will be designed to be easy to use and access will be provided to BCDC staff on their desktops.
- Customize the pilot ArcIMS project for BCDC staff and provide access through BCDC's existing intranet.

Project Accomplishments. The objectives were achieved by completing the following tasks:

- **Needs Assessment.** The purpose of the needs assessment was to identify the types of information that staff would like access to in BayRAT, the functions that staff would like, staff issues and concerns regarding the tool, and the most appropriate design of the tool. A survey was designed and distributed to receive input from all staff members and results were analyzed.

In addition, as part of the needs assessment process, staff determined that broad staff participation in the development of BayRAT would result in the best and most usable tool. Therefore, a working group comprised of volunteer BCDC staff representing various working units was convened. Working Group members met periodically as BayRAT was designed, built and tested.

- **Gather Data and Design Pilot Project.** The purpose of this phase of the project was to install the software, gather additional available data and create new spatial data from BCDC's files, and to design the pilot project.

Software Installation. ArcIMS was purchased and staff researched the technical information to identify the software's capabilities, limitations, available functions and alternatives. In addition, staff researched other ArcIMS projects on the Internet to identify positive and negative aspects of different configurations for different uses. Working collaboratively with the California Coastal Commission, the software was installed to the specifications identified by staff.

Data Gathering and Digitizing. All spatial data and associated metadata that currently exist within BCDC's offices were identified and catalogued. Based on the earlier needs assessment, staff researched, located and gathered additional spatial data that were available, compatible and appropriate for inclusion in BayRAT. The additional data were collected from various agencies and organizations. The staff proceeded to identify the desired BCDC focused spatial data for inclusion in BayRAT that were not yet available in digital form. With assistance from members of the BCDC Staff Working Group, a program for digitizing BCDC data from hard copy files was developed.

The amount and type of information to be digitized for use in the BayRAT pilot project was prioritized by the accessibility of the data and the availability of staff resources. Staff determined the most useful new spatial information to generate from BCDC's hard copy files was the location of all major permits approved by BCDC and basic associated information such as permittee's name, a brief project description, whether or not the permit included fill, and whether or not the permit required public access.

Research. Staff undertook research of websites utilizing ArcIMS to identify information on site design and available functions, including types and depth of information available and the level of complexity for users. In addition, general research on ArcIMS continued, including opportunities and limitations of the ArcIMS software, identification of any additional software that might improve or extend the functions of ArcIMS for BCDC's needs, and the availability and cost of any such additional software.

Coordination with Other Agencies and Organizations. Staff coordinated with other state and regional agencies and non-governmental organizations (including the Association of Bay Area Governments, the California Coastal Commission and GreenInfo Network) regarding identification, accumulation and configuration of data and the design of BayRAT. Discussion topics included compatibility of data among agencies and the need for data consistency and accuracy. In addition staff discussed the possibility of sharing a website in the future, hosted by one agency with assistance from other agencies, that would house data and be available to the public. Finally, staff at other agencies using ArcIMS were contacted to discuss problems with configuration, customization, user issues and the maintenance and management requirements of an ArcIMS project.

Design of Project. Based on the needs assessment, staff research, coordination with other agencies, and with the help of the Working Group, the pilot ArcIMS project was designed. Design issues included what data to include in the tool, the necessary functions, compatibility with BCDC's computerized permit tracking system for future linkage, and the overall look and usability of the tool.

- **Construct Pilot Project and Train Staff.** Phase 3 of the project involved completing the digitizing of new spatial data, construct the pilot project, provide access to BayRAT to BCDC staff, and training staff on the use of the tool. The staff digitized data from hard copy files to create spatial data for every major permit BCDC has approved, from 1969 through 2002.

Construction of Project. Based on the design completed under Task 2, staff constructed the BayRAT project using the ArcIMS software. Much customization was done during the construction process, generally by manipulating the Javascript code. Coordination with other agencies continued as staff researched ways to customize the project, and staff continued to rely on the Working Group for feedback during the construction and testing phase.

Placement of BayRAT on BCDC's Intranet. Staff working on BayRAT coordinated internally with BCDC's Information Technology staff to provide access to BayRAT through BCDC's existing Intranet. Staff accessing BayRAT through the Intranet are provided with basic introductory information, a link to a list of data layers available on BayRAT and links to associated metadata, a link to instructions on how to use BayRAT, and a link to begin using the tool. Exhibits 1 and 2 on the following pages provide screen captures showing two separate BayRAT queries.

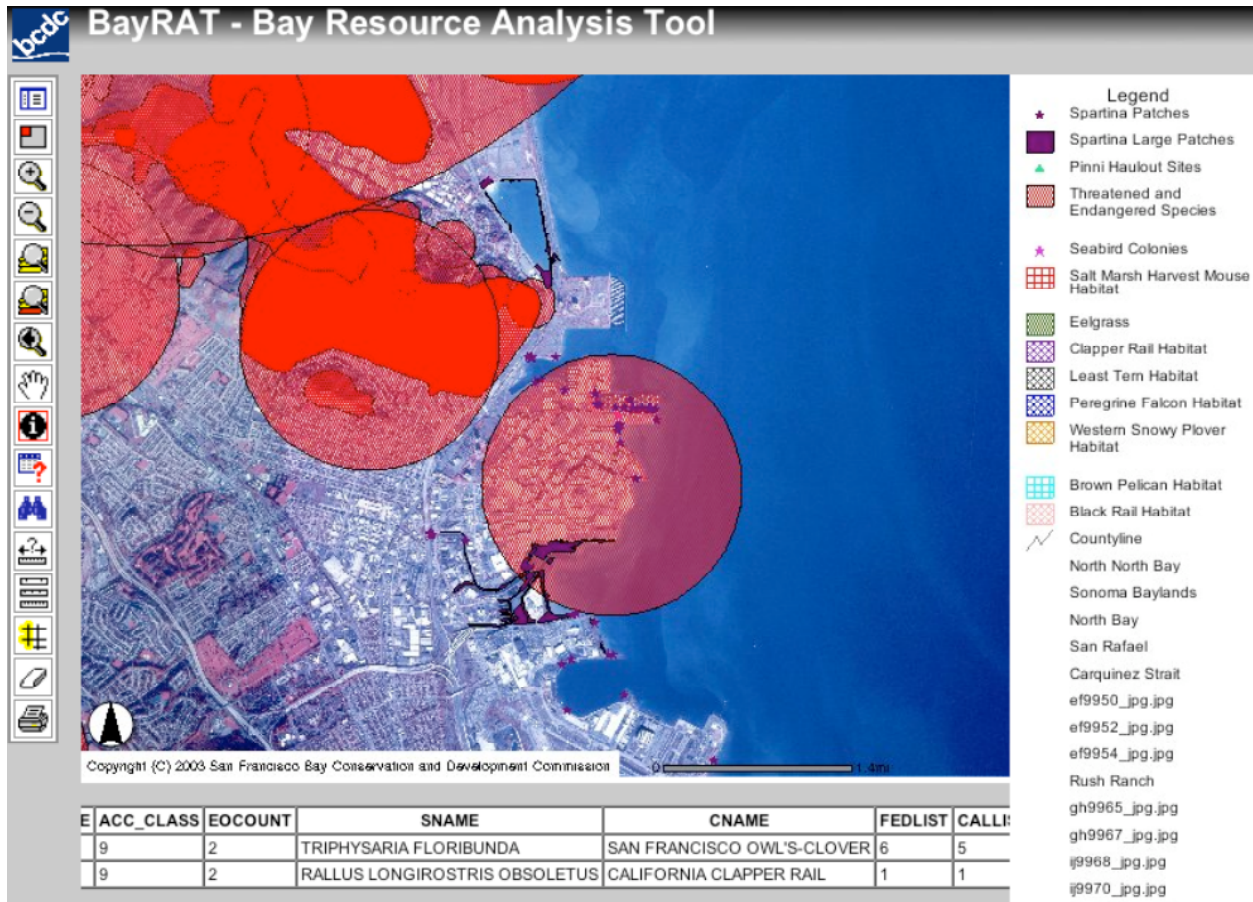
Training of Staff. BCDC staff were provided a group briefing on BayRAT which included a general description of the tool and instructions on how to use it. In addition, detailed instructions on how to use BayRAT are provided online through BCDC's Intranet. Finally, one-on-one training was provided for staff.

- **Develop Maintenance and Update Program.** Finally, the staff researched and recommended a program for the permanent maintenance and update of BayRAT. During the summer of 2003, BCDC secured staff assistance to digitize data from the majority of minor permits issued by BCDC. BayRAT is currently available on every staff members desktop and is used daily to respond more efficiently and effectively to public inquiries as well as to retrieve valuable data for permit analysis and planning research.

Exhibit 1

BayRAT Screen Capture

Shows Areas with Invasive Cord Grass and Threatened and Endangered Species Habitat

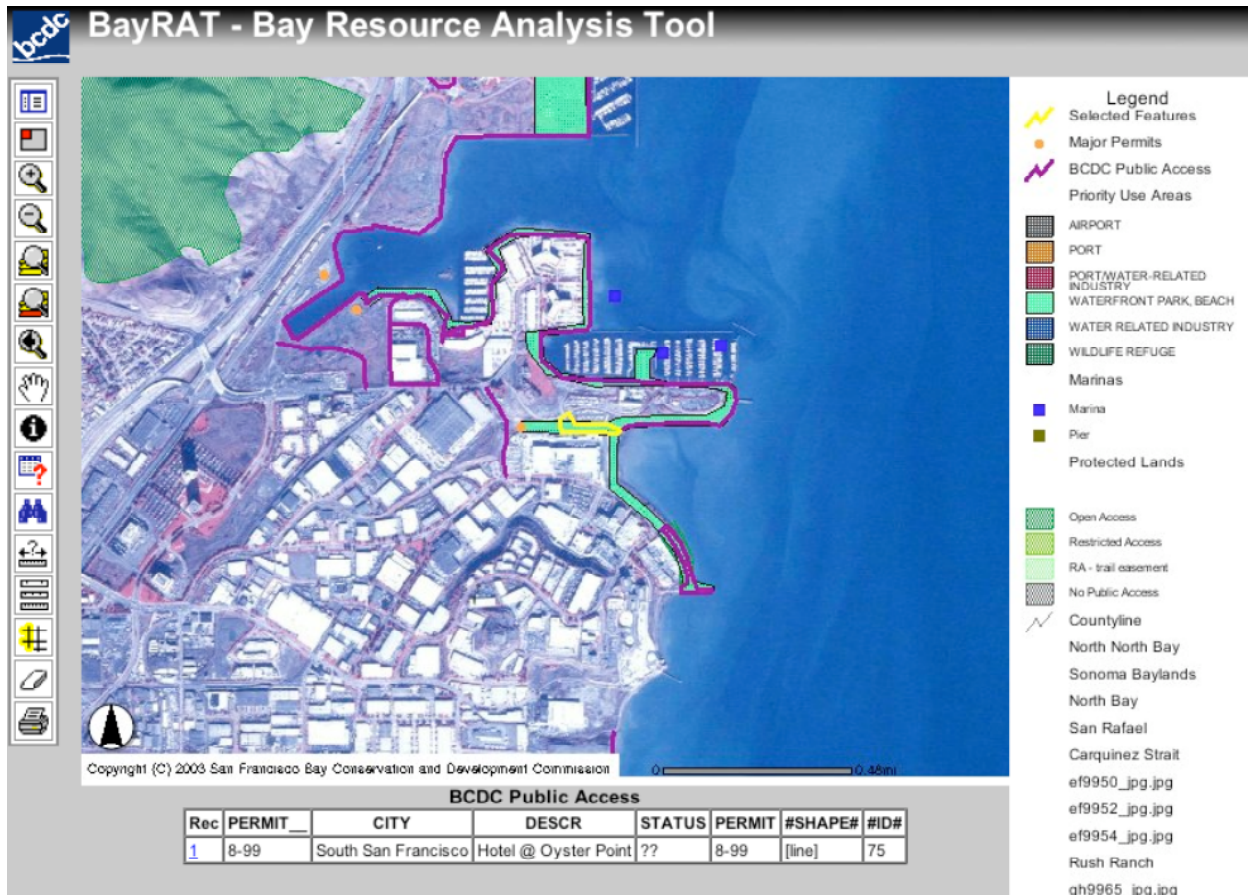


In looking at the data for federally and state listed threatened and endangered species, BayRAT shows that an endangered plant and the clapper rail have been sighted in the area. This gives a staff member an idea of what potential effects on natural resources to be aware of when reviewing a permit application for a project in this area.

Exhibit 2

BayRAT Screen Capture

Shows Multiple Features in the
Vicinity of a Selected Project Area



In reviewing a permit application for a project with proposed public access, BayRAT shows the staff the orientation of the public access as well as other selected features in the vicinity of the proposal, such as: BCDC-required public access; BCDC permits; open space areas; and the Bay Plan priority use area designations. On this part of the Bay shoreline, areas designated for waterfront park priority uses are adjacent to the proposal site and BayRAT shows existing public access adjacent to the site. The staff must ensure, among other things, that the project proposal is consistent with the waterfront park priority use designation and that public access proposal includes plans for a smooth connection to the existing public access.

Salt Pond Policy Update

The purpose of this project was to update the Bay Plan salt pond findings, policies and map designations after a thorough analysis of the complexity of issues surrounding the current salt production process, the public acquisition of some salt ponds for wetland restoration purposes, the restoration and wildlife management potential of salt ponds, and potential for reusing some of the ponds for uses other than salt production.

Project Objective. The objective of this Bay Plan update was to focus on the public policy issues that apply to the ponds that are still used for salt production, including many of the economic forces impacting the viability of salt production in the San Francisco Bay Area. In addition, the development potential of privately owned ponds no longer needed for salt production and considered surplus property by Cargill were considered. Further, broad policy issues regarding salt pond restoration were addressed in the Bay Plan update process, including what kinds of habitat the ponds should be restored to—either tidal marsh or managed pond—and how issues such as flooding and mercury methylation associated with restoration should be addressed. Another important aspect of this project was the review of the Plan Map salt pond designation. Over the years many areas once consisting of salt ponds has been restored or shifted to other uses which were not reflected in the Plan Maps. Thus, a holistic update of the Plan Maps and corresponding notes and policies relevant to salt ponds was in order. There was also a need to reconsider the Commission's salt pond jurisdiction found in Section 66610 (c) of the McAteer-Petris Act, as it was not clear how the jurisdiction of ponds no longer used for salt production and instead opened to tidal action or managed for shorebirds and waterfowl in a muted tidal regime should be defined.

Project Accomplishments. The objectives were achieved by completing the following tasks:

- **Research and Analysis.** The information and data collection entailed assessing information and data needs; conducting a literature search and developing a bibliography; collecting written and mapped material; and conducting interviews with BCDC staff, resource agency personnel, local governments and non-governmental organizations. The data and information was analyzed to define the range of policy issues and policy options that needed to be addressed in the Bay Plan salt pond policy study.
- **Draft Report and Bay Plan Amendment.** The staff prepared a draft staff report synthesizing the analysis of information previously gathered, which includes: (1) the history of salt production in San Francisco Bay; (2) the Commission's jurisdiction and authority regarding salt ponds; (3) the identification and mapping of the location and ownership of salt ponds; (4) the natural resource and environmental values and functions of the salt ponds; (5) the broad restoration issues, such as flood control; and (6) possible alternative uses of the salt ponds deemed surplus to the salt production system.
- **Circulate for Review and Comments.** The staff led a thorough scientific stakeholder and staff review of the draft staff background report and drafted proposed changes to the Bay Plan findings, policies, maps and priority use areas based on the draft report. The draft report and proposed Bay Plan amendment were then circulated to state and federal resource agencies, environmental organizations, Cargill Salt Company, BCDC staff and other interested parties for review and comment.

- **Prepare Final Staff Report and Bay Plan Amendment.** Staff prepared the final staff report and proposed Bay Plan Amendment based on the comments of reviewers. Revisions to the staff report and proposed Bay Plan amendment continued throughout the Bay Plan Amendment process until, in August 2005, the Commission adopted the revised findings, policies and priority use area designations. The Bay Plan amendment was reviewed and adopted by the California Office of Administrative review on October 25, 2005.

Recreation Policy Update

The recreation policy update is scheduled to be completed in December 2005. The purpose of this project is to update the Bay Plan recreation findings, policies and map designations after a thorough analysis of the complexity of issues surrounding population growth and demographic shifts, recent and potential acquisition of waterfront lands for recreation purposes, changes in the type of recreation desired by the public in waterfront parks and on San Francisco Bay, and potential some recreation needs to be met in Bay Area wildlife refuges.

Project Objectives. This Bay Plan update will focus on the policy issues that apply to waterfront parks designated in the Bay Plan, and to sites that may be designated as existing or future waterfront parks. In addition, the policy update will reflect the affects of changing demographics on the demand for recreation, and the changes in technology that have generated new ways of recreating on San Francisco Bay and along its shoreline. Further, broad policy issues addressing the compatibility of recreation and wildlife in waterfront parks and in wildlife refuges will be addressed, building on the work of the Commission's 2000-2001 Public Access and Wildlife Compatibility Study, while working within the planning process for the South Bay Salt Ponds Restoration Project. The Commission's participation in the California Boating Clean and Green Campaign, and the work of our NOAA Coastal Management Fellow on a pilot project to assess sediment and water quality conditions in select marinas have produced valuable insights regarding changes in Bay Area marinas. The policy update project will assess the policy implications of this and other information gleaned from work with stakeholders during the project. The 2002 update to the recreation policies addressing closed military facilities will be revisited to explore whether any of these policy changes can be generalized over all waterfront parks in the Bay Plan.

Project Accomplishments. The objectives are being achieved by completing the following tasks:

- **Research and Analysis.** The staff has assessed information and data needs; conducted a literature search and developed a bibliography; collected written and mapped material; and conducted interviews with BCDC staff, resource agency personnel, local governments and non-governmental organizations. Then the data and information were analyzed to define the range of policy issues and policy options that need to be addressed in the Bay Plan recreation policy study.
- **Prepare Draft Report.** The draft policy report synthesizes the information previously gathered. The draft recreation policy report and proposed changes to the Bay Plan recreation findings, policies, priority use areas, map notes and other map designations will be circulated to key public agency and non-governmental organization representatives.

- **Work in Progress.** The following work on this program change is in progress: draft the proposed changes to the Bay Plan recreation findings, policies, priority use areas and map designations and relevant plan map notes based on the amended staff policy report; circulate the draft policy report and the proposed Bay Plan amendment to local, regional, state and federal open space providers, marina operators, open space advocates BCDC staff and other interested parties for review and comment; prepare and publish a final staff policy report and proposed amendments to the Bay Plan recreation findings, policies, and waterfront park plan map designations, notes, policies and Commission suggestions; prepare and mail a brief descriptive notice of the proposed Bay Plan recreation amendment; hold a public hearing date for the Commission consideration of the staff report and staff recommended Bay Plan recreation findings, policies, priority use areas, and map notes and other designations amendment.

Enhancement Area Analysis

Introduction

The 1990 reauthorization of the federal Coastal Zone Management Act called for states to strengthen coastal management in the United States and its territories. One of the efforts to achieve this objective is the coastal zone enhancement grant program, established under Section 309 of the CZMA. The program encourages states to develop new and innovative approaches to address coastal issues of national significance and provides additional financial assistance for states to develop and implement changes to improve their coastal management programs in nine priority areas, as defined by the CZMA.

The following nine program areas are identified as candidates for enhancement under the section 309 program:

- (1) Protecting, enhancing, or creating wetlands.
- (2) Preventing or significantly reducing threats to life and property by controlling coastal development and redevelopment in hazardous areas, and anticipating and managing the effect of sea level rise.
- (3) Attaining increased opportunities for public access.
- (4) Reducing marine debris by managing uses and activities that contribute to marine debris.
- (5) Developing and adopting procedures to address the cumulative and secondary impacts of growth and development.
- (6) Preparing and implementing special area management plans.
- (7) Planning for the use of ocean resources.
- (8) Adopting procedures and policies to facilitate the siting of energy and government facilities and activities that may be of greater than local significance.
- (9) Improving procedures and policies for considering siting of marine aquaculture facilities while maintaining current levels of coastal resource protection.

The purpose of the enhancement grant program is to foster improvements in state coastal management programs in these specific areas, with a goal of improved protection for coastal resources. The CZMA is administered at the federal level by the Office of Ocean and Coastal Resource Management (OCRM) within the National Oceanic and Atmospheric Administration (NOAA). The federally approved management program for the San Francisco Bay segment of the California coastal management program is administered by the San Francisco Bay Conservation and Development Commission. The California Coastal Commission administers the coastal management program for the Pacific Ocean coastline segment of the California coastal zone. The enhancement program encourages states to achieve the nine objectives by

strengthening their coastal management programs with new laws, regulations or other enforceable mechanisms to provide greater protection for coastal resources. Program improvements are defined as changes to a state's federally approved coastal zone management program as opposed to changes in the manner in which the program is implemented. The types of changes that would qualify as program improvements include the following actions if they would improve a state's ability to achieve one or more of the coastal zone enhancement objectives:

- Changes to coastal zone boundaries.
- New or revised authorities, including statutes, regulations, enforceable policies, administrative decisions, executive orders and memoranda of agreement.
- New or revised local coastal zone programs and implementing ordinances.
- New or revised coastal land acquisition, management and restoration programs that attain one or more of the coastal zone enhancement objectives.
- New or revised special area management plans or plans for areas of particular concern.
- New or revised guidelines, procedures and policy documents.

Public Involvement, Partnerships, Scientific Integration. There are three important themes—public involvement, partnerships, and scientific integration—that emerged from the Commission's strategic planning process and are present in nearly every program improvement that is identified in this Assessment and Strategy.

Increasing the public's understanding of BCDC's mission, jurisdiction and authority has been a priority of the Commission since the 1990's to the present. The Commission adopted a comprehensive public information strategy in 2000, but has been unable to implement the strategy due budget cuts and a shortage of staff. Consequently, the comprehensive strategy for an extensive public education and outreach program has not been implemented as envisioned in the strategy. However, as with the 2000 Assessment and Strategy, the program improvements proposed herein include collaborative efforts with other agencies, non-government organizations, and the public as an effective way for BCDC to build relationships and broaden its recognition, thereby enhancing its management program.

Working collaboratively with other agencies, non-profit organizations and the public also leverages limited resources and results in more thorough and comprehensive program improvements. Since the 2000 Assessment and beyond, BCDC has successfully partnered with organizations to pool resources and accomplish program improvements that it otherwise would not have achieved. These partnerships are described in detail throughout the assessment. These collaborative efforts bring the goals and perspectives of multiple stakeholders into the planning process. Although this can complicate the planning process, the results of these efforts yield more comprehensive analysis and, ultimately, more effective Bay Plan policies.

Over the last decade, BCDC developed good working relationships with scientists to better integrate scientific information into its planning and regulatory processes. Sustaining and further developing these partnerships emerged as a central theme in BCDC's strategic planning. Therefore, this Assessment and Strategy explores mechanisms to further incorporate scientific information into BCDC processes and includes, within each proposed program change, a mechanism for involving the scientific community in and incorporating scientific information into the planning process.

Wetlands Protection and Restoration (High Priority)

Program objectives address the need to protect, restore or enhance existing coastal wetlands or to create new coastal wetlands.

Table 1. Wetland Trends Reported in 2000

Wetlands Type	Extent in acres		Trends % change
	ca. 1800	ca. 1988	
Tidal Marsh ^a	189,931	40,191	-79%
Non-Tidal (Diked managed and non-managed marsh) ^a	-	64,518	-
Freshwater (Diked agricultural lands - seasonal wetlands) ^a	-	34,620	-
Publicly Acquired Wetlands ("Protected" per SFBJVb)	22,000b		-
Restored Wetlands	n/a		-

a. Goals Project. 1999. *Baylands Ecosystem Habitat Goals*.

b. San Francisco Bay Joint Venture. January 2001. *Restoring the Estuary*.

Table 2. Wetland Improvements Since 2000

Acres Of Completed Wetland Protection, Restoration And Enhancement			
Wetlands Type	Activity		
	Protected	Restored	Enhanced
Bay Habitat			
Tidal Marsh	6,433	3,028	830
Salt Ponds	26,350	0	0
Other Bay Habitats	6,084	933	1,196
Bay Habitat Total	38,867	3,961	2,026
Seasonal Wetland (Diked agricultural lands)	3,767	1,037	1,397
Creeks/Riparian	46	157	130

c. San Francisco Bay Joint Venture. Project Tracking System, Customized Report. August 26, 2005

Background

Since 1850, nearly 80 percent of the Bay's tidal wetlands have been filled or diked. Farming, salt production and urbanization led to wetland conversion and filling of the Bay. Intensive urbanization following WW II resulted in large scale diking and filling of the majority of the Bay's remaining tidal wetlands. By the 1960s, 280 of the Bay's 680 square miles of surface area had been diked off from tidal action. Since the 1950s, however, the rate of wetland conversion slowed considerably, due in large part to the creation of BCDC in 1965. BCDC efforts have increased the size of the Bay by 8,105 acres (6,262 acres from 2001 to 2004).

In addition to providing important habitat for fish and wildlife, wetlands also contribute to flood control and shoreline stabilization, water quality maintenance and groundwater recharge, and open space and recreation opportunities. BCDC is mandated to eliminate unnecessary filling of Bay tidal and managed wetlands and the subsequent loss of this valuable natural resource.

Table 3. Threats to Wetlands

Threat	Significance
Development/fill	High
Erosion	High
Pollution	High
Channelization	Low
Nuisance or exotic species	High
Freshwater Input	High

BCDC's Wetlands Program. A reduction in the loss and conversion of Bay wetlands is a primary concern of BCDC. The Bay Plan recognizes the Bay as a complex biological system of open water, tidal flats, and tidal marsh and addresses potential adverse impacts to fish and wildlife habitat for even minor fill projects. Policies designed to support the essential role of wetlands in preserving the ecological vitality of the Bay are featured throughout the Bay Plan, but are most directly addressed in the following policy sections: Tidal Marshes and Tidal Flats, Subtidal Areas, Salt Ponds, Managed Wetlands, and Fish, Other Aquatic Organisms and Wildlife. Moreover, the Commission's mitigation policies provide for increases in the size of the Bay to offset impacts of permissible fill (the issues of invasive species, pollution, and fresh water inflows are discussed in the section on cumulative and secondary impacts).

Permit review for placement of fill and dredging in wetlands within the Commission's jurisdiction is the most effective method available to prevent the loss of wetlands. The Commission's permit jurisdiction over wetlands extends to open water, tidal marshes and tidal flats, certain waterways, as well as tidal marshes and tidal flats that were diked from the Bay and managed for salt production or as duck hunting preserves or game refuges. The Commission's policies require stringent analysis of all permit applications involving fill and/or dredging in wetlands to minimize potential adverse impacts. Where fill is permissible, project mitigation requirements, which are specified in permit conditions, generally require that mitigation be provided concurrently with those segments of the project creating adverse impacts. Mitigation usually takes the form of restoring to the Bay to equal or greater habitat values and often consists of creating new tidal marsh in areas that have formerly been diked from the Bay.

Many tidal wetlands around the Bay that were diked and used for agricultural purposes following the Gold Rush remain in agricultural use. The 80 square miles of diked historic baylands are found mainly in the Suisun and San Pablo Bay areas. Although BCDC's jurisdiction does not extend to the nearly 52,000 acres of privately-owned diked historic baylands, the Commission monitors activities in the historic baylands because of the important ecological interrelationship between these areas and the Bay, and comments on projects proposed in these areas to the local governments and U.S. Army Corps of Engineers.

The Suisun Marsh is protected through shared authority with the area local governments. The local governments have primary responsibility for carrying out the Commission's Suisun Marsh Plan in the upland area through local protection plans, while the Commission is primarily responsible for the wetlands, assuring that existing uses (duck clubs and extensive agriculture) continue, and that further development in the Marsh watershed does not adversely affect water quality.

Conclusions of Previous Assessment. In the 2000 Assessment, and Strategy the Commission concluded that it should continue its efforts to comprehensively update its program to protect and restore wetlands and incorporate recommendations of the Habitat Goals Report into its program by doing the following: (1) updating the Bay Plan policies on mitigation, salt ponds, and managed wetlands; and (2) participating as a core member in a subtidal goals project that would compile scientific information, map subtidal habitats, and establish goals for responsible use and protection of subtidal habitat areas. In the previous Assessment the Commission ranked its wetlands program as a high priority enhancement area. Although the Commission achieved most of its previous program enhancement objectives, with approximately 40,000 acres of wetland restoration in BCDC's jurisdiction either planned or already underway and the relatively fast evolution of restoration science, the wetlands program remains a high priority.

Changes in BCDC's Wetlands Program Since Previous Assessment

Table 4. Wetlands Management Changes

Management Category	Changes Since Last Assessment
Regulatory Programs	Significant
Wetlands Protection Standards	Moderate
Assessment Methodologies	<i>Moderate</i>
Impact Analysis	Moderate
Restoration/Enhancement Programs	Significant
SAMPs	None
Education/Outreach	Moderate
Wetlands Creation Programs	Significant
Acquisition Programs	Moderate

Wetlands Protection

- **Wetlands Policies.** In April of 2002 the Bay Plan policies on Marshes and Mudflats and Fish and Wildlife, which had not been updated since the Bay Plan's adoption in 1968, were updated and new policy sections were added. The update was described in BCDC's 2000 Assessment and Strategy as the Habitat Bay Plan amendment and involved, in parallel with the Habitat Goals Project, a comprehensive study and analysis of the many interconnected Bay habitats that formed that basis for new Bay Plan policy sections entitled, "Tidal Marshes and Tidal Flats," "Fish, Other Aquatic Organisms and Wildlife," and "Subtidal Areas." Some of the "on the ground" changes in managing Bay resources since the implementation of these updated and new Bay Plan policy sections are included below.

Fish, Other Aquatic Organisms and Wildlife. This policy update incorporated new scientific information and terminology into the Bay Plan findings and policies and ensured that the Commission moved beyond merely maintaining habitat for fish, other aquatic organisms, and wildlife to conserving, restoring, and increasing habitat. The policies further recognize the Commission's responsibilities as a state agency to conserve species at risk of extinction and to uphold the state and federal

endangered species acts within all areas of its jurisdiction. In upholding these laws, the Commission must consult with the relevant resource agencies prior to issuing any BCDC permit regarding a proposed project's impacts to fish, other aquatic organisms, and wildlife. A recent marina expansion proposal provides an example of how early consultation with other resource agencies can change entire project proposals and resolve any downstream permitting issues with other resource agencies. The marina, located in Marin County, had proposed to double in size by extending new marina slips over an area covered with eel grass beds. Through early consultation with NOAA Fisheries and the California Department of Fish and Game, the BCDC staff learned that both agencies believed that the construction impacts, as well as shading impacts of the new slips would significantly impact the eelgrass beds. Thus, because it was early enough in the process, the applicant was able to totally change the design of the new slips, moving them within the site and away from the existing eelgrass beds.

Subtidal Areas. The policies on subtidal areas enable the Commission to establish that some areas proposed for sand mining or dredging are unique resources not found in other areas of the Bay. The policies further allow BCDC to consider whether there are alternatives to mining sand or dredging in the Bay or at particular Bay sites.

Tidal Marshes and Tidal Flats. These policies were used in the analysis for the Initial Stewardship Plan for the South Bay Salt Ponds. Policy No. Four (restore diked former...) helped allow certain areas of the ponds to be opened to tidal action, even though the loss of some diked habitat would result in the loss of an alternative type of habitat (the high saline ponds). Furthermore, prior to the revision of these policies BCDC was unable to require specific analysis of the effects of implementing a restoration project on surrounding marshes and mudflats and sediment supply. These impacts are now routinely analyzed.

- **Mitigation Policies.** On October 17, 2002, the Commission approved an update to the Bay Plan policies on mitigation. The Commission has required compensatory mitigation for unavoidable adverse environmental impacts of projects as a condition of some permits since the early 1970's. In 1985, the Commission revised the Bay Plan to include policies on compensatory mitigation. The policies were adopted in an effort to reflect the Commission's past decisions regarding compensatory mitigation and to provide general guidelines for determining mitigation requirements.

The 2002 update to the policies responded to the evolution of scientific knowledge regarding habitat creation and restoration since 1985. In addition, public and private interest and investment in habitat restoration in the San Francisco Bay Area was increasing focus on regional restoration efforts, and regional visions for the types, amounts and distribution of wetlands and related habitats that are needed to restore and sustain a healthy Bay ecosystem. Finally, the updated mitigation policies incorporated considerable information on policies and practices related to mitigation that had been published in the previous decade, as well as the Commission's seventeen years of valuable practical experience in applying its mitigation policies and refining its permit conditions in an effort to successfully compensate for unavoidable adverse environmental impacts of projects it has permitted. Thus, the 2002 update to the mitigation policies included an extensive literature research on various aspects of mitigation and a review of fifteen years of the Commission's permits requiring mitigation.

The revision of the mitigation section of the Bay Plan established a policy basis, based on the latest scientific knowledge, to increase the success of compensatory mitigation for adverse impacts to Bay habitats. Specifically, the revised mitigation policies support a regional approach to mitigation requiring that individual compensatory mitigation be sited and designed within a Bay-wide ecological context to compensate for the impacts, ensure a high likelihood of success, and to support the improved health of the Bay ecological system. In addition, the policies do not specify required mitigation ratios, rather the policies require the determination of the amount and type of required mitigation based on an analysis of the risk of failure, the expected time delay between the impact and the functioning of the mitigation site, and the type and quality of the ecological functions of the proposed mitigation site as compared to the impacted site. Additional changes in the revised mitigation policies that affect on-the-ground management of wetlands include a preference for restoration over creation of habitat and the inclusion of transition zones and buffers where feasible and appropriate, to increase the quality of the habitat.

One specific example of how the updated mitigation policies have been implemented is a recent condominium and public access project that would have, as proposed, resulted in the loss of a small amount of wetland habitat. Using the mitigation policies, the staff worked with the permit applicant to make the following project changes: first, to revise the project to eliminate any avoidable wetland impacts and minimize any unavoidable impacts; second, explore onsite restoration of any impacted wetlands; and third, when the onsite restoration proved infeasible, to provide an in-lieu monetary contribution to ensure the success of a larger-scale restoration project that had been planned and designed within a Bay-wide ecological context.

- **Salt Pond Policies.** On August 18, 2005, the Commission approved an amendment to the Bay Plan policies on salt ponds. Prior to the amendment, the Bay Plan policies on salt ponds were nearly forty years old and had been approved when almost all of the ponds were in private ownership and were considered opportunities for real estate development. Major changes in salt pond ownership and use occurred during the nearly forty years that the salt pond policies were in place, including the transfer of a vast acreage of salt ponds to public ownership for restoration and management as wildlife habitat. Coupled with the changes in salt pond ownership was a significant increase in information on the habitat values of salt ponds as well as an increased understanding of the specific opportunities and challenges of undertaking projects that either restore salt ponds to tidal habitat or retain ponds that are managed specifically for waterbird habitat.

The update of the Bay Plan policies on salt ponds addressed these changes and issues by: (a) dividing the current salt ponds and managed wetlands section into two separate policy sections and developing specific findings and policies that better address the unique nature, use and status of salt ponds; (b) clarifying, deleting or revising finding and policy language that was confusing, duplicative, or no longer applicable; (c) updating the findings and policies to conform with the Commission's present practices and terminology; and (d) updating the salt pond Plan Map designations, notes, policies, and suggestions to reflect changes in salt pond ownership and use.

- **Managed Wetlands Policies.** Managed wetlands are diked wetland habitats that are managed for wildlife, primarily migratory waterfowl. Suisun Marsh has the greatest amount of managed wetland acreage in San Francisco Bay, totaling 52,000 acres, although other areas of the Bay have small amounts of this habitat type. Managed wetlands are located in private duck clubs and on publicly owned wildlife management areas and refuges. Fresh to brackish tidal water taken from streams or sloughs is the

primary water source for managed wetlands. Diverted water is delivered through tide gates and along artificial channels. Specific management objectives determine the timing, duration, depth, and extent of water ponding and drainage in a managed wetland, as well as vegetation management practices. Managed wetlands provide valuable habitat for migratory waterfowl, such as mallard, northern shoveler, northern pintail, and blue-winged teal, and are important habitat for resident shorebirds, such as Snowy egrets.

Managed wetlands are part of the Commission's jurisdiction and, as such, Bay Plan and the Suisun Marsh Plan findings and policies guide the Commission in its consideration of whether or not to authorize a development or change in use of this habitat area if proposed. Because the Bay Plan findings and policies pertaining to managed wetlands have not been updated since the Bay Plan's inception in 1968, and the findings and policies of the Marsh Plan have not been reviewed or updated since the Suisun Marsh Plan was adopted in 1976, they are out of date and in need of being amended in light of new scientific ecological information and new approaches to management or restoration of these areas. For example, the Bay Plan and Suisun Marsh Plan amendments should consider large-scale management and restoration planning efforts for managed wetlands underway in Suisun Marsh at the state and federal level (CALFED Program). In addition, the Commission's process of authorizing management practices undertaken by private duck clubs should be re-evaluated for its efficacy in promoting the most up-to-date environmental practices (e.g., requiring fish screens on water control structures). Finally, Bay Plan Maps identifying the location of managed wetlands are in need of being updated. Moreover the management plans for each of the 150 private duck clubs are being updated by the Suisun Resource Conservation District and the Commission must collect the information necessary to provide policy guidance to the management plan update process and to assist it in determining whether or not to certify the proposed updated plans.

An amendment to the Bay Plan and Suisun Marsh Plan findings and policies pertaining to managed wetlands is the only update relating to wetlands which remains to be completed in the suite of Bay Plan wetland policies (marshes and tidal flats, subtidal areas, salt ponds and managed wetlands), as defined in the Commission's coastal management program improvement Strategy and the Commission's Bay Plan update work program. Revision of the managed wetlands section of the Bay Plan that was initiated in October 2005, will complete the ambitious update of all the Bay Plan wetland policies and will include managed wetland policies of the Suisun Marsh Plan.

The updated Bay Plan and Suisun Marsh Plan findings, policies and map designations pertaining to managed wetlands would incorporate new information regarding: (1) managed wetland habitat values; (2) the location of managed wetlands; (3) land management approaches undertaken by private duck clubs responsible for maintaining some managed wetlands; (4) restoration or management objectives proposed by public agencies responsible for maintaining other managed wetlands; and (5) possible conversion of some managed wetlands to tidal marsh and subtidal habitat.

- **Subtidal Habitat and Species.** In preparing the background report for the Bay Plan Habitat project, the BCDC staff identified areas where information about subtidal habitats was lacking and convened a panel of scientific experts on submerged habitats and tidal hydraulics to discuss the relative values of various submerged habitat types and explore their recommendations for appropriate restoration and protection techniques. The panel identified gaps in knowledge that prevent us from satisfactorily understanding and managing submerged habitats. Additionally, the panel addressed the question of marine or estuarine refuges, and if such refuges might be needed for particular subtidal species or habitats in the Bay. Thus, the Bay Plan policies on subtidal areas were developed using the best available science.

Gaps in knowledge were identified through the staff's research and the subtidal panel discussion, such as the need to identify, document and describe subtidal habitats and their function, value and inter-/intra-relationships within the San Francisco Estuary. Also lacking are protection priorities, opportunities, and mechanisms, as well as restoration and enhancement needs and mechanisms.

In addition, more information is needed regarding potential impacts to subtidal habitats from increased human use. For example, the extraction of Bay resources, such as sand and shell deposits, has tested the limits of information on subtidal habitats in recent years. As an example, sand mining in San Francisco Bay has increased significantly over the last ten to fifteen years as land sources of sand and aggregates have been depleted. Under existing BCDC permits, a total of 2.65 million cubic yards of sand can be mined from the Bay each year (1.5 million cubic yards in Central Bay, and 1.15 million cubic yards from Carquinez Strait to the Suisun Bay). Currently, nearly the entire sandy bottom of the Central Bay is leased for mining, as are smaller areas in the Delta. Recently, the sand mining industry has indicated that it may be seeking approval to mine additional amounts of sand and possibly expand the extent of its operations within the Bay and Delta.

Sand mining has potential adverse environmental impacts. To assess these impacts the sand mining industry recently completed a lengthy study of its industry in the Bay utilizing existing information, but was unable to fully describe the impacts of sand mining on Bay resources. Also, the current Bay Plan policies on extraction of shell deposits provide little guidance regarding the volume and conditions under which the Commission should permit the shell deposits to be removed. These policies have not been reviewed or updated since the Bay Plan was adopted in 1968.

Recently, the Bay Plan was updated to include new dredging policies (2000), and subtidal areas policies (2003), but the existing dredging findings and policies do not fully address all the potential impacts of sand mining, as they focus on the disposal aspect of dredging, not the effects of dredging itself. In addition, the findings and policies do not address the environmental effects of shell mining. Therefore, a comprehensive, revised policy section addressing the extraction of Bay resources may be needed for the Bay Plan to provide up-to-date policy guidance to the Commission on the extraction of sand, shells, and possibly other resources from the Bay.

In addition, there is a lack of knowledge regarding the Bay's sediment budget and transport properties. Understanding the amount of sediment entering and leaving the Bay and shifting from one part of the Bay to another is essential for tidal marsh restoration projects, sand mining and dredging operations, and legacy contaminants associated with sediment. Sediment enters the Bay from fresh water inflow, erosion of local land forms, and the ocean. Sediment leaves the Bay through tidal outflow as suspended sediment and through dredging and sand mining activities where it is disturbed and sometimes disposed of or reused outside of the Bay. Sediment is in constant movement around the Bay, being picked up by tides and currents and re-deposited in other parts of the Bay. Some of the larger tidal marsh restoration sites in the Bay Area have required the addition of large volumes of sediment to raise existing grades to elevations suitable for marsh plane development, thus expediting the restoration process, and reducing the potential for sediment to be scavenged from the adjacent mudflats. Exacerbating the demands for sediment is the steady decline of fresh water inflow that transports sediments to the Bay and dams on Bay tributaries that have trapped and retained sediments that would have otherwise transported to the Bay. More information about the sediment budget and sediment transport is needed to fully understand the impacts of depleting sediment sources and removing sediment from the Bay.

These various information needs regarding the Bay's subtidal system will be addressed through a cooperative interagency Subtidal Habitat Goals Project modeled on the highly successful Baylands Habitat Goals Project. BCDC has already entered into a partnership with NOAA Fisheries, NOAA's National Ocean Service, U.S. Environmental Protection Agency, the California Coastal Conservancy, and the San Francisco Estuary Project to serve together as the administrative core group for the Subtidal Habitat Goals Project. The San Francisco Subtidal Habitat Goals Project will establish a comprehensive, long-term management vision for protection, restoration, and appropriate use of the subtidal system in the San Francisco Estuary. The vision will identify and prioritize challenges and threats to the San Francisco estuary ecosystem and provide a biological basis to guide protection strategies, restoration and research priorities, and management policies of public resource agencies, as well as decisions by nonprofit conservation organizations, local governments, legislators and private foundations regarding preservation, enhancement, modification and use of subtidal habitats.

Wetlands Restoration and Enhancement

- **Hamilton Field.** Hamilton Wetlands Restoration Project, located at the former Hamilton Air Force Base in Marin County, will restore 630 acres of a former army airfield to tidal and seasonal marsh. Through a partnership with U.S. Army Corps of Engineers and the California Coastal Conservancy, the project sponsors, the Commission staff serves as a technical advisor for the wetlands restoration project. The closed military base presents a unique opportunity to demonstrate the beneficial reuse of over ten million cubic yards of clean dredged material from the Bay to restore a diverse mix of tidal and seasonal wetlands. The restored wetlands will provide habitat for endangered and special status species, waterfowl using the Pacific flyway, a nursery for anadromous and resident fish species, and contribute to restoring and ensuring the health of San Francisco Bay.

The Commission staff worked closely with the Conservancy and the Corps to prepare and manage technical planning studies and participate in outreach efforts to implement the Hamilton Field restoration. The Water Board approved the project in July 2005 and the Commission authorized the project on August 18, 2005, both with unanimous votes. The project is currently under construction, preparing the site for the first delivery of 2.1 million cubic yards of dredged sediment from the Port of Oakland's Fifty Foot Deepening project scheduled to arrive in early summer 2006. Additional dredged sediment is anticipated to come from the Corps maintenance dredging of the federal shipping channels, and other dredging projects around the Bay. The project is scheduled to be completed by 2014, when the outboard levee will be breached, and tidal waters will once again enter the site. Further development of the site will occur as the Bay and the wetlands site seek equilibrium and tidal channels and marsh develop.

- **San Francisco Bay Area Conservancy Program.** The San Francisco Bay Area program of the California Coastal Conservancy is not only involved in wetland restoration, resource enhancement and public access projects around the Bay shoreline, but is also authorized to do open space, parks, educational centers, campgrounds and other types of open space, recreation, access and natural resource projects anywhere in the nine Bay Area counties. The Conservancy works to restore and enhance wetlands throughout the Bay, the most notable current projects are the approximately 20,000-acre South Bay Salt Pond Project, the 5,000-acre Napa-Sonoma Salt Marsh Restoration Project in the North Bay, the Hamilton Airfield project. To help BCDC overcome budgetary restrictions the California Coastal Conservancy has provided funding which supports staff time so the Commission can play an active role in both the South Bay salt pond planning process and the Hamilton wetland restoration project.

- **Regional Coordination.** The 2000 Assessment and Strategy discussed the Commission's involvement in three major efforts to promote a regionally coordinated approach to wetlands protection and restoration: the Habitat Goals Project; the San Francisco Bay Joint Venture; and the Bay Area Wetlands Planning Group. All three efforts have evolved to further the goal of regional coordination in wetlands protection and restoration.

First, the Commission's involvement in the Habitat Goals Project (2000 Assessment and Strategy, p. 26-28) formed the base upon which the Habitat Bay Plan Amendments were built. The Baylands Ecosystem Habitat Goals Report, published in 1999, and the Baylands Ecosystem Species and Community Profiles, published in 2000, continue to guide wetland protection, restoration, and enhancement planning efforts as well as project design.

Second, the Commission participates in the San Francisco Bay Joint Venture. The concept of a joint venture was envisioned as a means to implement the Comprehensive Conservation and Management Plan (CCMP) for San Francisco Bay, an integrated estuary plan developed over five years by a consortium of 42 signatory agencies and organizations. The CCMP called for the formation of a joint venture to increase the acreage of wetlands protected in the Estuary. The Commission was a signatory agency of the CCMP and is a member of the Joint Venture. Since the 2000 Assessment and Strategy the Joint Venture has become a partner in the majority of wetland protection and restoration projects in the Bay and has created a Project Tracking System. The Project Tracking System is a geographic information system that monitors and tracks wetland acquisitions, restoration, and enhancement projects by habitat type.

Finally, the Commission was active in the Bay Area Wetlands Planning Group designated by the California Resources Agency (2000 Assessment and Strategy, p. 34). One of the outgrowths of this group was the Wetlands Design Review Group (WDRG), which was managed by the Environmental Protection Agency in cooperation with multiple agencies and organizations, including BCDC. The WDRG organized scientific panels to review the design of wetland restoration projects. The panel reviews provided a forum for regulatory agencies to collaborate on project analysis and to incorporate expert scientific review into their respective permit processes. When the WDRG lost funding for its single staff position, the group was no longer able to function. The Joint Venture is now planning to take responsibility for managing a similar wetlands design review group, in which BCDC will participate.

- **Science Integration.** The Commission's involvement in the Habitat Goals Project and the Bay Area Wetlands Planning Group was an important channel for integrating new scientific information about the Bay ecosystem into the Commission's wetlands protection program and incorporating new information into Bay Plan policies. However, the level of scientific knowledge about Bay resources is more sophisticated and specialized than ever. Permit evaluations for projects in the Bay increasingly require coordination between the staff and the scientific community to assess the potential impacts of projects and minimize harmful affects to Bay resources as required in the McAtter-Petris Act. There is a need to evaluate ways to expand communication with scientists and incorporate scientific review into all Commission processes. Developing more expansive and consistent communication with scientists could involve any of the following methods of implementation: create a science advisory panel similar to the DRB or ECRB; set up science seminars for BCDC staff; expand BCDC's role in the Wetlands Design Review Group (WDRG); and evaluate whether policies are needed to support the use of scientific review in permit processing.

- **The Central California Ocean Observing System (CeNCOOS)** is a new initiative and part of the U.S. Integrated Ocean Observing System (IOOS). CeNCOOS was created to coordinate and support the development and implementation of a regional ocean observing system, as part of the IOOS, which provides data and data products to a diversity of end users on spatial and temporal scales appropriate for their needs. The IOOS will be based on a national backbone of platforms and sensors, collecting data on a standard suite of variables, over broad spatial and temporal scales to meet the following objectives: detect and forecast oceanic components of climate variability; facilitate safe and efficient marine operations; ensure national security; manage resources for sustainable use; preserve and restore healthy marine ecosystems; mitigate natural hazards; and ensure public health. CeNCOOS will augment the national backbone with additional ocean observation data collection. The Commission is a CeNCOOS partner and has been active in providing information about regional data needs as well as providing a forum for diverse private and public interests to participate in the CeNCOOS program.

Priority Objectives to Improve BCDC's Wetlands Program. The Commission should expand protection of the Bay's wetlands and foster wetland restoration programs through refining its Bay Plan policies, such as by addressing:

- **Managed Wetlands Policies.** As part of its effort to develop and implement a comprehensive program for the use and restoration of Bay resources, the Commission should update the Bay Plan and the Suisun Marsh Plan findings, policies and map designations pertaining to managed wetlands. The managed wetlands findings, policies and map designations need to be updated to incorporate new information regarding: (1) managed wetland habitat values; (2) the location of managed wetlands; (3) land managed approaches undertaken by private duck clubs responsible for maintaining some managed wetlands; (4) restoration or management objectives proposed by public agencies responsible for maintaining other managed wetlands; and (5) possible conversion of some managed wetlands to tidal and subtidal habitat.
- **Subtidal Habitats.** Bay Area decision-makers are increasingly asked to make decisions that affect subtidal habitats. These include decisions on the relative importance of subtidal habitats (e.g., do we need more shallow water versus deep water habitats?); on appropriate restoration techniques (should shallow water habitats be restored with dredged materials or by returning areas diked from the Bay to tidal action?); and on the appropriateness of large-scale fill for subtidal habitat improvement.

However, more scientific information is needed for aquatic (shallow and deep water) habitats in the Bay to ensure that policy decision making is based on sound science. No comprehensive inventory exists of the types, components, locations, and characteristics of aquatic habitats in the Bay. Nor is there a full understanding of the threats to these habitats; the relative importance of each subtype of habitat in comparison to others; or techniques to protect or preserve these resources. Various components of aquatic habitat quality (such as water quality or freshwater inflow) have been addressed individually, but not from a strategic, habitat-based perspective.

Although BCDC assembled existing information in its work on the Bay Plan subtidal areas policies, further work remains to be done. BCDC has already entered into a partnership with NOAA Fisheries, NOAA's National Ocean Service, U.S. Environmental Protection Agency, the California Coastal Conservancy, and the San Francisco Estuary Project to serve together as the administrative core group for a Subtidal Habitat Goals Project. With appropriate resources, BCDC could continue its core role in the subtidal goals projects and update the Bay Plan findings, policies and map designations pertaining to subtidal areas, including sand and shell extraction, sediment movement in the Bay, and function and value of subtidal habitats.

Included in this new Subtidal Goals Project should be a concerted effort to identify subtidal habitats in San Francisco Bay and understand their function, to identify restoration priorities for subtidal habitats, and to identify additional research needs. In addition, there should be a concerted effort to develop goals for the management, sustainable use, protection, restoration and enhancement of subtidal habitats based on best available information and input from scientists, resource managers, industry and other users of the Bay. (See Special Area Management Planning for a discussion of Marine Protected Areas.)

Additional Opportunities to Improve BCDC's Wetlands Program. In addition to the wetlands protection program improvements discussed above, the Commission could expand its efforts to develop and implement a comprehensive program for the use and restoration of Bay resources by doing the following:

- **Science Integration.** Permit evaluations for projects in the Bay increasingly require coordination between the staff and the scientific community to assess the potential impacts of projects and minimize harmful affects to Bay resources as required in the McAteer-Petris Act. There is a need to evaluate ways to expand communication with scientists and incorporate scientific review into all Commission processes. Developing more expansive and consistent communication with scientists could involve any of the following methods of implementation: create a science advisory panel similar to the DRB or ECRB; set up science seminars for BCDC staff; expand BCDC's role in the Wetlands Design Review Group (WDRG); and evaluate whether policies are needed to support the use of scientific review in permit processing and, if needed, develop new Bay Plan policies.

Coastal Hazards (High Priority)

Program objectives address the need to prevent or significantly reduce threats to life and destruction of property by controlling development and redevelopment in high hazard areas, managing development in other hazard areas, and anticipating and managing the effects of potential sea level rise.

Table 5. Risks from Coastal Hazards

Hazard	High Risk	Medium Risk	Low Risk
Hurricane/Typhoons			X
Flooding	X		
Storm Surge		X	
Episodic Erosion	X		
Chronic Erosion		X	
Sea Level Rise	X		
Subsidence	X		
Earthquakes	X		
Tsunamis		X	

Background. San Francisco Bay is located in an active and dangerous seismic zone. Earthquakes can destroy structures and breach levees that protect low-lying areas adjacent to the Bay. Improper placement of fill can magnify ground shaking and the destructive force of earthquakes and contribute to ground failure and collapse of structures. Substandard engineering of old fill encircling much of the Bay heightens risks to persons and property in the shoreline area. Chronic hazards, including relative sea level rise and shoreline erosion, are potentially equally damaging to the Bay Area. Secondary effects may include damage to storm water drainage and sewer systems and saltwater intrusion into surface and below ground fresh water aquifers.

BCDC's Coastal Hazards Program. Section 66605(e) of the McAteer-Petris Act requires the Commission to ensure that any fill project it approves in the Bay is "constructed with sound safety standards which will afford reasonable protection to persons and property against the hazards of unstable geologic or soil conditions or of flood or storm waters." Further, the Bay Plan offers specific policies on safety of fills and sea level rise to reduce the risk of life and damage of property.

By undertaking studies, developing policies and implementing them through permit review and intergovernmental coordination, the Commission has actively responded to the potential danger created by natural hazards. The Commission primarily uses the permit review process and its advisory Engineering Criteria Review Board to minimize hazardous effects in new Bay fill areas. Pursuant to the McAteer-Petris Act, BCDC exercises safety authority in its "bay" jurisdiction; however, in its shoreline band jurisdiction, the Commission's authority is generally limited to assuring that proposed projects provide maximum feasible public access to the Bay or that priority use areas are reserved for their designated uses (Section 66632.4). The Commission does not have safety authority in the shoreline band under the McAteer-Petris Act.

Seismic Hazards. The Safety of Fills section of the Bay Plan recognizes the risks to life and damage to property related to construction on filled lands. A number of measures are intended to minimize these risks, including extensive project review and permit conditions specifying methods of construction and fill placement. Because so much of the land within the Commission's shoreline band jurisdiction is old, non-engineered fill, structures are as susceptible to earthquake damage in these areas as on new Bay fill.

Fundamental to BCDC's program in addressing coastal hazards is the Engineering Criteria Review Board (ECRB), established to consider seismic safety conditions. The ECRB reviews permit applications for major Bay fill projects to ensure that appropriate state-of-the-art safety criteria are used in their design and construction. The Board has been highly successful in establishing and revising safety criteria for fills and structures; reviewing projects for safety provisions and providing recommendations for improvements; developing an inspection system; and gathering performance data on specific projects. These activities are intended to complement the functions of local building and planning departments. Over the past two decades, ECRB review has resulted in significant improvements in the seismic engineering of fills and structures placed on them.

Sea Level Rise. The Bay Plan's Safety of Fills findings and policies were amended in 1989 to recognize the impact of accelerated relative sea level rise and to incorporate tidal flood protection engineering design review procedures and criteria into the Commission's permit review process. (Relative sea level rise refers to the sum of (1) a rise in global sea level and (2) land elevation change (lifting or subsidence). Rising relative sea level may contribute to overtopping of levees that protect urban development, agricultural lands, managed wetlands, and salt evaporation ponds. The rise in water level would be particularly damaging during storm surges and extreme high tides. A rapidly rising Bay could inundate unprotected low-lying areas, increase periodic flooding of previously protected low-lying areas, disrupt storm drainage systems, erode tidal marsh, shoreline and beach areas, and lead to salt water intrusion into fresh water tributaries and groundwater. The Commission

held a workshop in the late 1980s for local governments and interested parties to explain relative sea level rise and steps local agencies can take to address its impacts. However, the Commission's outreach program to local government on sea level rise was curtailed because of funding constraints. The staff engineer has focused on major transportation projects that have been proposed in the last several years.

Shoreline Erosion. Shoreline erosion threatens structures, roads, recreation facilities, and farmlands. Most of the Bay's shoreline is retreating inland as storms, rain, waves, water runoff, vertical and horizontal land movement, and changes in water level (relative sea level rise) erode the shoreline. The Protection of the Shoreline section of the Bay Plan incorporates findings and policies to guide BCDC's permit actions concerning shoreline erosion protection projects. New erosion control projects or reconstruction and maintenance efforts are authorized if found to be necessary, appropriate to the site, and properly engineered and constructed. Since the Commission has adopted these policies, the staff has worked with shoreline protection project applicants and their engineers to ensure that shoreline protection projects are consistent with the Commission's policies.

Subsidence. Land subsidence can result from natural events such as earthquakes, but also can be hastened to a great degree by human activities. Common reasons for subsidence in the Bay Area are the placement of heavy fill on Bay mud and extensive pumping of groundwater, which in turn can cause flooding, erosion and groundwater contamination. Without levees or other protective measures, flooding would be of particular concern to areas of the South Bay that have experienced extensive subsidence.

BCDC is limited to recommendations and conditions to minimize the threat of subsidence created by activities outside its jurisdiction, such as groundwater pumping. These conditions, which could include diking and leveeing affected areas, can only respond to the undesirable effects of the activities, rather than prevent land from subsiding. Compounding the problem is the limited knowledge regarding the precise locations of groundwater reservoirs. As part of BCDC's dredging program and in addition to other research developed through the Long Term Management Strategy (LTMS) for dredged materials disposal in the region, Commission staff believes that it is important to assess the feasibility of using dredged material for stabilizing levees in the Sacramento-San Joaquin Delta. In developing an avenue for the safe disposal of dredged spoils, the proposed program to protect hundreds of miles of Delta levees could prove to be of equal benefit to San Francisco Bay. Salinity impacts of importing Bay material to the Delta is a continuing concern.

Conclusions of Previous Assessment. The Commission should improve its coastal management program by working cooperatively with local governments to ensure that development in shoreline areas incorporates current safety standards. BCDC could update its landmark study of the effects of sea level rise on the Bay, and the Safety of Fills Bay Plan policies, incorporating applicable scientific knowledge developed since the adoption of the Bay Plan sea level policies in 1989. The Commission could conduct workshops to coordinate with local governments and interested parties to develop programs to address impacts of sea level rise. BCDC also could institute a collective effort of Bay Area governments to use both Commission, local and other resources to re-establish geodetic bench marks needed to accurately determine relative sea level and the risks associated with relative sea level rise. In the previous Assessment the Commission ranked its coastal hazards program as a medium priority enhancement area. For this Assessment, considering the increasing data regarding the accelerated rate of sea level rise and new information about other potential impacts of climate change on the Bay, the Commission elevated its coastal hazards program from medium to high priority.

Changes in BCDC's Coastal Hazards Program since Previous Assessment

Table 6. Changes in Coastal Hazards Management

Mechanism	Changes Since Last Assessment
Building restrictions/setbacks	None
Repair/rebuilding restrictions	None
Restrict "hard" shoreline protection structures	None
Promote alternative shoreline stabilization methods	Moderate
Renovation of shoreline protection structures	None
Beach/ dune protection	None
Permit compliance program	Moderate*
Inlet management plans	None
SAMPs	None
Local hazards mitigation planning	Moderate
Local post-disaster redevelopment plans	None
Methodologies for determining setbacks	None
Disclosure requirements	None
Public education and outreach	None
Mapping/GIS/tracking of hazard areas	None

*Between 1999-2002 the enforcement program, responsible for permit compliance, grew from 2 enforcement analyst to 4. Since 2002, budget cuts have left just 2.5 enforcement analyst positions.

- Engineering Support.** Through an interagency agreement with the California Department of Transportation (Caltrans), funding was provided to the Commission for one full-time engineer who devoted a major portion of his or her time to coordinating with Caltrans on its proposed projects and to engineering issues in other proposed permits and planning projects. The agreement with Caltrans was modified after BCDC lost permit staff positions through a series of budget cuts. Caltrans now provides funding to the Commission to support one permit staff position dedicated solely to processing permits for Caltrans projects. This arrangement ensures that the processing of Caltrans permits is expedited and that BCDC retains a permit staff position that would otherwise be lost. However, it leaves the Commission without a staff engineer, which is a critical component of the Commission's program to ensure the safety of fill proposals in the Bay and protect the Bay Area from coastal hazards.
- Global Climate Change.** BCDC first became concerned about the impacts of climate change on the Bay 20 years ago when the Commission undertook a pioneering study on accelerated sea level rise and developed policies to account for sea level rise in all fill projects in the Bay. Aside from the increasing annual rate of sea level rise in the Bay, other changes in the last 20 years necessitate a broader approach that addresses the overall impacts of climate change on San Francisco Bay, including, but not limited to, accelerated sea level rise.

The Intergovernmental Panel on Climate Change (IPCC) established by the World Meteorological Organization and the United Nations Environmental Program reports that human-induced climate change is a reality and that climate models consistently predict an increase in temperature between 2°-6° C (3.6°-10.8° F) over the next 100 years. Climate change may exacerbate impacts to water resources in areas, such as California, where water is scarce. At the recent State of the San Francisco Estuary Conference, J.A. Dracup and S. Vicuna from the University of California at Berkeley presented research showing “regions that have a large fraction of runoff driven by snowmelt would be especially susceptible to changes in temperature, because temperature determines the fraction of precipitation that falls as snow or as rain and determines the timing of the snowmelt process.” This is especially significant for the San Francisco Bay-Delta and the state, because the Sierra Nevada snowpack is the major source of fresh water for the entire state. Much of the Sierra Nevada snowmelt eventually flows into the Sacramento and San Joaquin Rivers and is diverted through state and federal water projects before reaching the Bay-Delta. The predicted changes in precipitation and snowmelt described by Dracup and Vicuna coupled with projected population increase and growth in the Central Valley will significantly alter the volume of fresh water inflow to the Bay, thereby impacting the Suisun Marsh, water circulation throughout the Bay, species composition, sedimentation rates and distribution, and marsh restoration activities.

In regards to sea level rise, the U.S. Environmental Protection Agency estimates that by 2100, sea level will increase nearly two feet in many coastal areas of the United States, with half of this increase directly attributable to global warming. Historical records show that sea level in San Francisco Bay has risen nearly 18 cm (7 inches) over the past 150 years, increasing at an annual rate of 1-2 mm/yr (0.04-0.08 inches). Not only is this trend expected to continue, but annual rates are increasing. Estimates of future annual sea level rise in the Bay vary from 0.1 to 0.9 meters (up to 3 feet) by 2100. The increasing trend in sea level points to the importance of the Commission’s continued study and consideration of sea level rise in planning and managing Bay resources and shoreline development.

New information about the impacts of global warming and changes in the kinds of activities in the Bay require a review of and update to BCDC’s existing policies and a collaborative approach to addressing the impacts of climate change on San Francisco Bay. The Bay area is at the peak of a shift from developing the Bay to restoring the Bay. Over thirty thousand acres of tidal marsh in the Bay are planned for restoration in the next twenty years and new policy guidance may be necessary to adequately account for the impacts of climate change in restoration planning. In addition, the pace of shoreline development remains relatively constant while most local governments continue to approve new projects on the shoreline with little consideration of future impacts from sea level rise. Therefore, a coordinated approach to planning for the impacts of climate change that includes local governments, restoration scientists, and non-profit organizations is necessary to ensure that restoration efforts in the Bay and development on the shoreline will endure over time, that shoreline projects are safe from tidal flooding and destruction, and that Bay resources are protected.

- **Disaster Planning.** Since the 2000 Assessment and Strategy, three major world events occurred that impact disaster planning in all coastal areas: (1) the 9/11 destruction of the World Trade Center; (2) the Tsunami in Southeast Asia; and (3) Hurricane Katrina. The aftermath of each of these three events has either highlighted some of the existing threats in the Bay Area from coastal hazards and/or created new challenges and raised new issues in protecting economic and natural Bay resources. In addition, the three commercial airports in the Bay Area—San Francisco International Airport, Oakland International Airport, and Norman Y. Mineta International Airport (San Jose)—are all built in seismically hazardous areas subject to liquefaction. Although each airport has a plan to respond to a disaster for its own internal operation, there is no plan that provides an integrated regional response to a regional disaster such as a major earthquake. BCDC and its partners, the Association of

Bay Area Governments and the Metropolitan Transportation Commission who have formed the Regional Airport Planning Committee, should work with the airports and the Federal Aviation Authority to prepare a regional airport disaster and risk management plan and strategy provided funding becomes available.

Security. Since the destruction of the World Trade Center on September 11, 2001, the newly formed United States Office of Homeland Security has been working with the United States Coast Guard to implement heightened security in coastal areas. The Bay Area is central to California's economy and, as such, it is a target for terrorist activities that could have devastating effects on the Bay. Along the shoreline of the Bay, federal agencies have inspected and required new security facilities at marine oil terminals and passenger terminals for both ferries and cruise ships. Many of the security facilities—often fences or security gates—require a permit from BCDC and, therefore, must be analyzed for their impacts to shoreline public access. Heightened security measures have also been imposed on maritime cargo and oil transportation activities within the Bay that may present use conflicts, such as with the Bay Water Trail project described herein in the section on public access. BCDC must work proactively to reduce the impacts of a terrorist attack on the Bay by coordinating in advance with the multiple government agencies and non profit organizations that would provide services. In the event of such an attack, government agencies and non profit organizations must have a coordinated plan to respond and BCDC must determine where its role is in such circumstances.

Earthquakes, Tsunamis and Seiches. After the 1988 Loma Prieta earthquake, BCDC studied and reported on the seismic safety of fill in the Bay approved through BCDC permits as well as study the impacts of pressures to dispose of rubble in the Bay and within the 100-foot shoreline band in the aftermath of the earthquake. Since that time, there have been advancements in the science of and technology for analyzing and predicting earthquakes along specific fault lines, which may lead to a more accurate assessment of the potential impacts from earthquakes on the Bay. In addition, it is necessary to evaluate how changes in the structure and operations of the Federal Emergency Management Agency might impact its ability to provide emergency assistance and what the impacts may be on the Bay.

There are eight major earthquake faults running through the Bay Area. Included in these are the Hayward Fault and the San Andreas Fault, which, according to the Association of Bay Area Governments, have respectively a 27 percent and 21 percent probability of a magnitude 6.7 or greater earthquake in the next 30 years. The shoreline areas surrounding the entire San Francisco Bay have the greatest likelihood of experiencing intense shaking from future earthquakes. Because much of the shoreline is un-engineered fill placed prior to BCDC's creation and, thus, not subject to review by BCDC's Engineering Criteria Review Board, buildings on this un-engineered fill are particularly at risk.

Related to earthquakes, is the potential hazards from tsunamis and seiches in San Francisco Bay. A tsunami is an ocean wave produced by a sub-marine earthquake, landslide, or volcanic eruption. These waves may reach enormous dimensions and have sufficient energy to travel across entire oceans. A seiche is a free or standing wave oscillation of the surface of water in an enclosed basin that is initiated by local atmospheric changes, tidal currents, or earthquakes—similar to water sloshing in a bathtub. Substantial damage from a seiche in the Bay is more likely than such damage from a tsunami, because the constraints of the relatively narrow Golden Gate would reduce any tsunami wave energy entering the Bay. There were approximately 49 small

tsunamis recorded at the San Francisco and Sausalito tide gauges between 1854 and 2001, only two of which appear to have been marginally significant. The 1906 tsunami began at the San Andreas fault and moved northwest toward Bolinas Lagoon. The 1964 tsunami originated from the Gulf of Alaska. It caused damage to floating structures and boats along the Bay shoreline in Marin County and caused oscillations on the Point San Pablo tide gauge that continued for ten days. Increasing evidence suggests that seismic activity along the coast of Alaska could cause a tsunami large enough to penetrate the Marin County, Contra Costa County, and Alameda County shorelines and cause substantial damage to levees, floating and pile-supported structures. However, more information is needed to determine what the impacts of a major disaster, such as an earthquake or seiche, would be on the Bay and respond appropriately.

Flooding. The threat of a tsunami, sea level rise, and increases in the magnitude of storm events pose significant flooding hazards in some areas along the Bay shoreline. The developed and undeveloped lands in the South Bay sit below Mean Sea Level and are protected only by the system of old levees and salt ponds that are planned for restoration in the following 20-50 years. Similarly, the diked Baylands in the North Bay have subsided significantly below Mean Sea Level and are susceptible to flooding. Any development within these subsided areas in the South Bay and North Bay is at risk of flooding.

The Bay Area must be prepared for the impacts of natural and human-induced disasters that pose real and significant risks to the lives and property of its residents and its natural resources. Multiple agencies are involved in planning and preparing for disasters in the state as well as the region. There is a great need to identify the major issues BCDC could confront following a disaster and how BCDC can best work with other agencies to prepare for disasters. It is essential to coordinate proactively with the agencies involved in disaster planning in order to protect Bay resources to the maximum extent feasible during and after a disaster. This coordinated effort would lead to better disaster planning, updates to the policies in the Bay Plan pertaining to safety of fill and shoreline protection, and new policies on disaster preparedness where appropriate.

Priority Objectives to Improve BCDC's Coastal Hazards Program. The Commission should improve its coastal management program by working cooperatively with local governments to ensure that development in shoreline areas incorporates current safety standards.

- **Global Climate Change.** As part of its effort to improve its coastal hazards program by working cooperatively with stakeholders to address the impacts of human-induced climate change on Bay resources and shoreline development, the Commission should update the Bay Plan findings and policies pertaining to sea level rise and other adverse impacts of climate change. One approach to addressing this key issue would be to develop a three-phased project. In the first phase, conduct extensive research on human-induced climate change and coordinate with other planning bodies and scientists to identify the major impacts on the Bay and associated issues. In the second phase, inform local governments, stakeholders, and the public in the Bay Area regarding the potential impacts of and approaches to planning for human-induced climate change and develop a regional planning approach for addressing the impacts of climate change on Bay resources. Finally, the Bay Plan policies need to be updated to account for new information about the far reaching impacts of human-induced climate change on the Bay, including, but not limited to, accelerated sea level rise.

Potential Additional Funding and/or Partnership Opportunities. The Commission identified the following agencies that currently work on climate change as potential sources of additional funding or as potential partners in a project specific to San Francisco Bay:

CALFED Bay-Delta Program
California Department of Water Resources
California Energy Commission
Environmental Protection Agency
Federal Emergency Management Agency
National Oceanic and Atmospheric Administration
Universities (particularly UC Berkeley and Scripps Institute of Oceanography)
U.S. Army Corps of Engineers

- **Disaster Planning.** As part of its effort to improve its coastal hazards program by working cooperatively with government agencies to address the impacts of disasters on Bay resources and shoreline development, including airports, the Commission should update the Bay Plan findings and policies pertaining to shoreline protection, transportation, airports, and safety of fills. Multiple agencies are involved in planning and preparing for disasters in the state as well as the region. There is a great need to identify the major issues BCDC could confront following a disaster and how BCDC can best work with other agencies to prepare for disasters. It is essential to coordinate with the agencies involved in disaster planning in order to protect Bay resources and regional surface water and air transportation and port facilities to the maximum extent feasible during and after a disaster. This coordinated effort would lead to better disaster planning, updates to the policies in the Bay Plan pertaining to safety of fill and shoreline protection, and new policies on disaster preparedness where appropriate.

Potential Additional Funding and/or Partnership Opportunities. The Commission identified the following agencies that currently work on disaster preparedness as potential sources of additional funding or as potential partners in a project specific to BCDC's role and response to disasters in the San Francisco Bay Area:

Association of Bay Area Governments
California Office of Emergency Services
California Office of Spill Prevention and Response
California Seismic Safety Commission
Department of Homeland Security
Federal Emergency Management Agency
Local governments
U.S. Army Corps of Engineers

Energy and Government Facility Siting (*High Priority*)

Program objectives address the need for adoption of procedures and enforceable policies to help facilitate the siting of energy facilities and energy-related activities and government activities that may be of greater than local significance while maintaining current levels of coastal resource protection.

Background. The San Francisco Bay and shoreline feature a number of uses related to energy and government facilities. Located primarily on the northeastern shoreline, energy-related uses include oil and natural gas, refined petroleum product, processing facilities, refineries, marine terminals for storing and transporting oil and gas, natural gas extraction and storage facilities, and other ancillary uses. Public facilities such as airports, ports, and military bases encircle the Bay. Recognizing that shoreline areas for water-oriented land uses are limited and should be

reserved for such uses, the McAteer-Petris Act (Section 66602.1) requires BCDC to “make provision for adequate and suitable locations” for water-oriented land uses as specified in the Act. Water-related industry, ports, and airports are among those uses designated in the Bay Plan as high priority uses of the San Francisco Bay shoreline, and uses for which BCDC may authorize fill in the Bay.

The McAteer-Petris Act also provides a role for BCDC in the licensing of power plants by laying out the framework for BCDC’s involvement with the California Energy Resources and Development Commission (CEC) and its thermal power plant permitting authority. The law requires BCDC to submit findings to the CEC on specific power plant proposals and mandates BCDC to prepare and keep updated a report on specific locations in its jurisdiction where the siting of a power plant would be inconsistent with the McAteer-Petris Act, the Suisun Marsh Preservation Act, the Bay Plan, and the Suisun Marsh Plan.

In conformance with its laws and policies, BCDC has initiated working relationships with a number of agencies controlling shoreline holdings to coordinate planning, protection, and management efforts, and has produced studies on the facilitation of siting of energy and government facilities. These undertakings have led to amendments to the Bay Plan and specific plans intended to accurately reflect the findings and policies of the studies. The *Thermal Power Plant Non-Siting Study* and *San Francisco Bay Area Seaport Plan* (Seaport Plan) are representative of BCDC’s efforts to work cooperatively with state and regional agencies, municipalities, and facilities operators to meet long-range planning needs.

BCDC’s Energy and Government Facility Program

- **Energy Program.** To maintain balance between the protection of the Bay’s natural resources and the development of needed power plants, BCDC works cooperatively with the California Energy Resources Conservation and Development Commission (CEC) to consider suitable sites for proposed energy facilities. A BCDC permit is not required for power plant projects, because the CEC has the exclusive power to “certify,” in lieu of any State or local government permit, all power plant projects in the State. However, where a power plant is proposed within BCDC’s jurisdiction, Public Resources Code Section 25523 requires the CEC to include in any decision to approve the project, provisions to satisfy the Commission’s laws and policies as established in findings and recommendations submitted by the Commission, unless the CEC specifically finds that the adoption of the recommended provisions would result in greater adverse effect on the environment or the provisions proposed in the report would not be feasible. Section 66645 of the McAteer-Petris Act requires the Commission’s report to specify whether the project is consistent with the Act and the Bay Plan and, if it is inconsistent, the modifications required to make it consistent.

The provisions of the McAteer-Petris Act further require BCEC to consider the most recent comprehensive Biennial Report of the CEC in its efforts to update the *Thermal Power Plant Non-Siting Study* (Non-siting Study). The Energy Commission is prohibited from placing any power plant within BCDC’s jurisdiction at a location not identified as appropriate for such use by BCDC. The Non-Siting Study, identifies those areas of the Bay, its salt ponds and managed wetlands, and 100-foot shoreline band around the Bay not suitable for power plant siting due to inconsistencies with the Bay Plan or the *Suisun Marsh Protection Plan*.

- **Airports.** There are three major commercial airports in the Bay Area—Oakland, San Francisco, and San Jose—sited along or near the Bay. The shoreline locations are favored because the Bay provides open space for takeoffs and landings directed away from populated areas, and results in less noise carried to those areas. The Bay shoreline locations also provide ready access to densely populated urban centers. Although there are small reliever airports in the Bay Area, the overwhelming majority of passenger and cargo air traffic is handled at the three major facilities.

The Bay Plan designates airport priority use areas along the Bay shoreline. However, filling of the Bay for expansion or construction of airport facilities is permitted only if it is found that there is no remaining capacity at any Bay Area airport and that there is no upland location to accommodate the air service demand, for example a new airport. If fill for airport facilities is permitted, adverse impacts must be fully mitigated and public access to the Bay must be provided to the extent consistent with the project.

The Regional Airport System Planning Analysis (RASPA), first prepared in 1982 and updated in 1994 and 2000 by the Regional Airport Planning Committee (RAPC), primarily to address runway expansion plans at the San Francisco and Oakland airports in the 2000 update of the RASPA. BCDC is a co-sponsoring agency of the RAPC with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG). The RASPA outlines the long-term development requirements of all airports in the region, including general aviation airports. Airport projects that expand terminal and runway capacity and improve ground access must be consistent with the RASPA to receive public funding assistance. The document serves as the air transportation element of MTC's Regional Transportation Plan, the comprehensive program MTC is responsible for developing to meet Bay Area transportation needs. The Commission has generally looked to the RASPA to guide airport growth and development, and encourages airports in the region to coordinate their facility planning with the RAPC. Through a regional planning approach, congestion at airports may be relieved by diverting passengers, cargo, and general aviation to airfields able to accommodate additional traffic.

- **Seaports.** San Francisco Bay is one of the world's great natural harbors and the area's ports are major contributors to the economic vitality of the region. Five general purpose ports serve the Bay: Oakland, San Francisco, Redwood City, Richmond and Benicia. The Commission recognizes the substantial public benefits of developing an adequate regional system of port facilities capable of keeping San Francisco Bay in the forefront of the world's great harbors, particularly during a period of rapid change in the shipping industry. The Bay Area expects the volume of container cargo to nearly triple from the 1988 baseline forecast by 2020, requiring large, specially designed terminals and supporting transportation facilities. BCDC, in cooperation with MTC, developed the Seaport Plan to ensure the continued vitality of the region's port system.

The Seaport Plan is a component of the Bay Plan and the maritime element of MTC's Regional Transportation Plan. First developed in 1982, the Seaport Plan has been revised several times to incorporate revised cargo forecasts and modify port priority use area designations. The plan is produced by the advisory Seaport Planning Advisory Committee (SPAC), consisting of representatives of local, state and federal agencies, the ports, and environmental and development interest groups and recommended to BCDC and MTC for adoption. The Seaport Plan provides BCDC with policies for reviewing permit applications, environmental assessments, federal consistency requirements, and MTC with policies for reviewing environmental assessments and funding applications. The plan also calls for local governments to institute land use protections for the designated port areas.

- **Federal Government Facilities.** The coastal zone for San Francisco Bay is defined as all the area within BCDC's McAteer-Petris Act jurisdiction. Federal approval of the Commission's coastal management program for the Bay requires federal agencies to comply with state program policies. Federal projects or activities that affect the coastal zone are thus subject to review for consistency with policies of the McAteer-Petris Act, the Bay Plan, the Suisun Marsh Preservation Act and Local Protection Programs, even if the

activities occur inland from the coastal zone. BCDC's federal authority therefore can extend beyond the 100-foot shoreline band, particularly to encompass priority use areas designated in the Bay Plan. State policy directs that a change in use of federal property cannot take place if it would result in a use that is inconsistent with the Bay Plan's designated priority use areas.

Over the last fifteen years, a number of military bases sited along the Bay have been closed and designated for new uses, which required consistency review by the Commission. BCDC worked closely with local agencies planning for base reuse to ensure that proposed future uses are consistent with the Commission's applicable plans and policies to the fullest extent possible. These former military bases have been changed ownership and been converted to various uses including, but not limited to, the following: (1) privately owned and managed for public and private uses, such as the Presidio in San Francisco; (2) federally owned and managed for public uses, such as the Golden Gate National Recreation Area; and (3) owned by local governments and managed as marine terminals for port uses, such as the former Oakland Army Base in Oakland.

- **Oil Spill Prevention and Response Program.** Petroleum-related marine facilities within BCDC's jurisdiction include 26 marine terminals accommodating approximately 3,000 oil transfers per year. Additionally, approximately 760 tanker and more than 3,100 deep draft vessels traverse the Bay every year. Because waters of this area are confined and currents very strong, and because the waters are often subject to strong winds, damage from oil spills to the Bay's natural and cultural resources can be significant.

Funded by the state Office of Oil Spill Prevention and Response, BCDC implements the provisions of the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act that requires BCDC to participate in programs designed to prevent oil spills in San Francisco, San Pablo and Suisun Bays. BCDC's efforts in preventing oil spills help to protect over a 1,000 species of fish and wildlife that live in or visit San Francisco Bay, several of which are threatened or endangered, and the habitats they need to survive. BCDC also participates with federal, state and local agencies, and industry in the development of comprehensive oil spill response plans for this geographic region.

The principal focus for the BCDC oil spill program since 1996 has been navigational safety and oil spill prevention. A BCDC commissioner and a staff member serve on the Harbor Safety Committee of the San Francisco Bay Region (HSC), and BCDC is also a member of the U.S. Coast Guard's Area Contingency Planning Committee. BCDC continues to work within these committees and subcommittees, assisting federal, state and local agencies, marine facilities, vessel and tow companies, and harbor pilots in the development and implementation of strong regulations and procedures for vessel and facility safety, public health, and environmental protection. In addition, BCDC reviews oil spill contingency response plans for the more than 40 marine facilities around the Bay. BCDC oil spill staff also participates in oil spill drills and training exercises around the Bay and assist the BCDC regulatory programs on matters that may raise navigational safety or oil spill issues.

As part of its efforts to increase navigational safety, BCDC also continues to support the expanded application of GIS and the National Ocean Service (NOS) Physical Oceanographic Real-Time System (PORTS) (which provides real-time current, tide, salinity and wind data for San Francisco Bay) for use by those in the maritime field. This information can also be used during a spill and, combined with the local knowledge of harbor pilots, commercial fishing interests, and environmental organizations, it can increase the accuracy of spill trajectory projections and contribute to faster, more efficient response.

Conclusions of Previous Assessment. In the 2000 Assessment and Strategy the Commission concluded that it should continue its efforts to comprehensively update its program to plan for energy and government facility siting by performing a comprehensive update of the Thermal Power Plant Non-Siting Report. The Commission also identified additional opportunities to improve its government and energy facility planning program doing the following: (1) fulfill its mandate to protect the Bay and its resources by developing appropriate Bay Plan policies to address oil spill prevention and navigation safety; and (2) continue to monitor port and energy-related activities to anticipate the need to update priority use area designations in the Bay Plan and to ensure that shoreline areas needed for ports, airports, and water-related industries, such as oil refineries, are not preempted by other land uses that can be accommodated elsewhere. In the previous Assessment, the Commission ranked its facility siting program as a high priority enhancement area. Although the Commission achieved its previous program enhancement area objectives, the Commission recognized a need to update the Bay Plan policies on airports and on water-related industry. Therefore, in this Assessment, the facility siting program remains a high priority.

Changes in BCDC's Facility Siting Program Since the Previous Assessment

- **Airport Planning.** The 2000 amendment of the RASP predicted significant increases in air traffic through 2020 and concluded that expansions at all three Bay Area commercial airports were needed to meet air travel demand. Capacity expansion was proposed at all three of the major airports. However, the events of September 11, 2001, and the subsequent economic downturn had the affect of reducing air traffic. While some of the airport expansion projects within the Commission's shoreline band have already received permits from the Commission, the San Francisco International Airport's proposal to fill approximately two square miles of the Bay for new runways was abandoned.

Under the Memorandum of Agreement between BCDC, ABAG and MTC that established RAPC, BCDC will assume responsibility for staffing the RAPC for a two-year period beginning in the spring of 2006. RAPC's work program calls for reviewing and possibly updating the RASPA regarding possible use of Moffett Air Field and Travis Air Force Base for commercial air service. If FAA funding is available to support this airport planning work, the BCDC staff will take the lead in updating the RASPA. The staff can maximize its time and effort in updating the RASPA by updating the Bay Plan airport policies in conjunction with the RASPA work. The update of the Bay Plan policies continues to be important, especially with the changes in the aviation industry security and travel demand since the 2000 RASPA amendment. It is critical that the Bay Plan findings, policies and priority use area designations reflect and respond to these changes in the aviation industry so that BCDC has the most up-to-date policy guidance when permitting future airport expansion projects.

- **Power Plant Study.** BCDC updated its report associated with the siting of power plants in 2002. The update was in response to both a state mandate that the report be updated every five years and to the energy crisis that was facing California in 2001. The updated report, entitled *Siting Thermal Power Plants in the Jurisdiction of the San Francisco Bay Conservation and Development Commission*, was completed on October 25, 2002. The Commission determined that the power plant siting report and the maps should be accompanied by a Commission regulation, which would be used to implement the report and the maps. A proposed regulation, Regulation Section 11021, was prepared by staff and circulated per the requirements of the State Administrative Procedures Act. The Commission held a public hearing on November 7, 2002 on the power plant siting report and the Regulation 11021. On December 5, 2002 the Commission approved the power plant siting report and the associated maps. In addition, in a separate action, the Commission approved Regulation 11021. The update includes a complete rewriting and reformatting of the report, which involved the

creation of a GIS project that compiled BCDC public access areas and priority use areas, habitat and species information and regional assets such as shoreline parks. BCDC worked with the California Energy Commission to complete the report, which addressed issues such as the identification of areas where power plants may not be sited due to the sensitive nature of the resources in those areas, the potential environmental and cultural impacts of locating power plants along the Bay shoreline and the factors that must be considered when siting a power plant along the Bay shoreline, such as physical and visual access to the Bay. The revised Thermal Power Plant Siting Study was funded through a Section 309 grant.

- **Petroleum Infrastructure Needs.** The Water-Related Industry section of the Bay Plan contains findings, policies and priority use area designations for water-related industries, such as marine petroleum terminals and refineries. Although there seems to be little interest in the development of new or expanded water-related industries, there may be a need to expand oil terminals, refineries and other petroleum facilities to meet California's projected energy demands.

The CEC assesses California's projected energy demands and the state's petroleum infrastructure needs in each biennial energy report. In its *2005 Integrated Energy Policy Report*, the CEC writes that petroleum imports will increase because "the demand for petroleum fuels is rising at a higher rate than supply produced by California's refineries." Petroleum imports enter the state primarily through marine terminals in the Los Angeles/Long Beach area and the Bay Area. Although the CEC determined that additional refining capacity is needed in the state, refineries are unlikely to invest in refinery expansions due to perceived regulatory hurdles. As a result, the CEC concludes that expansions in marine terminals will be needed to accommodate the increased petroleum imports.

- **Seaport Planning and Cargo Monitoring.** In February 2003, the Commission approved an update to the Seaport Plan that addressed changes in bulk cargo throughput and forecasts through 2020. The amendment deleted five port priority use areas designated for bulk cargo and incorporated the new cargo information into the planning document.

The Seaport Plan includes findings and policies concerning the need for annual cargo monitoring to provide a basis for ongoing review of the Seaport Plan's findings and policies concerning container and bulk cargo marine terminal designations. The data collected through the monitoring process is used to evaluate requests for changes in marine terminal or port priority use designations, including possible deletions of such designations. An ongoing cargo monitoring process also eliminates the need for updating the Seaport Plan every five years and allows the Seaport Planning Advisory Committee (SPAC) to recommend updates to the Plan on an as-needed basis. It also allows the SPAC to consider individual requests for amendments to port priority use areas and marine terminal designations.

The staff has gathered cargo data from 1996 to the present to carry out the monitoring program. The staff began by collecting information to cover the period since preparation of the 1996 update of the Seaport Plan, and to continue collecting Bay Area cargo shipping information annually thereafter. Staff worked with each of the six Bay Area ports to collect data on the number of ship calls and tonnage handled at the individual terminals for the years 1994-1998. In 2000, staff updated the cargo monitoring program with data from the ports for the year 1999 and in February 2003, the Metropolitan Transportation Commission and BCDC voted to amend the Seaport Plan by incorporating bulk cargo forecasts generated in 2002. The staff continues to update Bay Area cargo data and present the information to the SPAC and the Commission on an annual basis. This task is included in the Commission's general fund budget.

In its most recent report to the Commission, the staff reported the following:

“The data collected from the Bay Area ports reveal that total maritime cargo has increased since 1994, and in 2004, surpassed the forecast for the first time. When the individual cargo modes are analyzed, container cargo, the largest segment of the region’s maritime cargo shipping, remains healthy, generally tracking closely to the Seaport Plan cargo forecast. Non-petroleum liquid, dry and neo-bulk also are in line with revised forecast levels; however, break bulk cargo continues to fall considerably short of the projected growth.”

- **Federal Facilities Reuse.** Since 2000, the Commission has worked with multiple agencies to convert federal facilities, primarily former military bases, to a range of new uses, including port, commercial and recreational uses.

Port Uses. In September 2000, BCDC initiated work on an application from the Oakland Base Reuse Authority (Reuse Authority) and the Port of Oakland (Port) to amend the Bay Plan and the Seaport Plan to delete approximately one-half of the port priority use area designation at the Oakland Army Base in Oakland. The Bay Plan and the Seaport Plan designated the entire Oakland Army base as a port priority use area “if and when no longer needed by the military.” The Oakland Army Base was designated surplus by Congress in the late 1990s. Reuse Authority was charged with preparing plans for the transfer of the property. The Army Base was adjacent to the Port of Oakland, the Bay Area’s largest port and sole container port.

Under the proposed Bay Plan amendment, the Port of Oakland would receive 184 acres of the Army Base designated for port priority use in the Bay Plan and would combine these 184 acres with the Port’s existing maritime facilities. This action would allow the Port to reconfigure and develop a total of approximately 1,235 acres of contiguous land it would own for port priority use. Of the 1,235 acres, the Port would devote 1,000 acres to container terminals, while the remaining 235 acres would be devoted to a new joint intermodal rail yard and storage tracks (160 acres), and a port ancillary support area for trucking purposes (75 acres).

However, deleting the port priority use area from the remainder of the Army Base and transferring that property to the Reuse Authority would mean that three future container cargo berths at the Army Terminal and Bay Bridge site, that would require 127 acres of new Bay fill to accomplish, could not be constructed as called for in the Seaport Plan and thought necessary for the Port to meet the Seaport Plan 2020 cargo projections for the Port. However based on the applicants’ and BCDC staff analysis, it was determined that the 1,000 acres of marine terminals and relocated joint intermodal rail yard would allow the Port to provide a port layout that would create greater operation efficiency and thus achieve the necessary throughput capacity of about 24 million metric tons of marine cargo by 2020, the Seaport Plan target date. Moreover, the increased efficiency would allow the Port to exceed 2020 container cargo forecast by approximately .5 million metric tons and without the 127 acres of fill needed to achieve the forecast without the amendment.

In addition, it was determined that additional land was needed in the vicinity of the Port for trucking purposes to move containers from the terminals to inland markets. The Port reserved 75 acres of its port priority use property exclusively for port ancillary uses that involve trucking and the Port and the Reuse Authority each agreed to provide an additional 30 acres of land —15 acres each—on or adjacent to the Army Base for trucking uses.

In 2001, the Commission amended the Bay Plan as requested by the Port and the Reuse Authority thereby retaining sufficient land at the Oakland Army Base to be transferred to the Port that would enable the Port to meet the Seaport Plan 2020 cargo forecast; freed up the remaining half of the Army Base for transfer to the Base Use Authority for other uses; and eliminated the need for 127 acres of new Bay fill to meet the Seaport Plan cargo forecast.

Commercial and Recreational Uses. Subsequent to and consistent with the Commission's earlier work with local agencies planning for military base reuse, the Commission concurred with a number of federal consistency projects for base reuse since the 2000 Assessment and Strategy, including, but not limited to the following projects:

1. In 2002, the Commission concurred in the Presidio Trust's determination that the proposed Presidio Trust Management Plan, proposed for a portion of the Presidio in the City and County San Francisco, is consistent with the Commission's federally approved coastal management program. The Presidio Trust Management Plan proposes 5.6 million square feet of buildings, 360,000 square feet less than currently exists. Some new construction will occur and many non-historic buildings will be removed. Building space will include approximately 3,000,000 square feet of mixed-use, non-residential building space and 2,000,000 square feet of residential space.
 2. In 2000, the Commission concurred with a consistency determination from the National Park Service for the implementation of a plan to incorporate the 335-acre former Fort Baker Army base at the northern shoreline of the Golden Gate as part of the Golden Gate National Recreation Area. The major elements of the plan called for providing recreational and visitor-serving facilities by enhancing and restoring provide public access along the waterfront; rehabilitating historic structures; and adding approximately 30,000 square feet of new structures surrounding the parade ground for use as a retreat, conference center and up to 350 guest rooms. The existing Bay Area Discovery Museum and Coast Guard facility will be retained and expanded. Pursuant to a legal challenge by the City of Sausalito, the Park Service agreed to limit the number of guest rooms in the conference center to a maximum of 225. In early 2005, the Commission unanimously voted to concur with the Park Service's consistency determination for the revised plan.
- **Oil Spill Prevention and Response Program.** In order to carry out the goals and objectives of California's McAteer-Petris Act and its Lempert-Keene-Seastrand Oil Spill Prevention and Response Act, BCDC developed new Bay Plan findings and policies pertaining to navigational safety and oil spill response that became effective in July 2001. The new findings and policies recognize the environmental benefits of navigational safety and oil spill prevention and provide policy guidance to the Commission on issues related to navigational safety, oil spill prevention, and response.

Public Education. As a member of the HSC Prevention through People work group, BCDC staff co-authored a video, "Sharing the Bay," and accompanying brochure, "Rules 9 and 5—Laws to Live By," to educate recreational boaters about safe interaction with ships, barges and ferries. More than 200 videos have been distributed nationally through Coast Guard Auxiliaries, Power Squadrons, yacht clubs and the National Harbor Safety Committee. The work group also produced the brochure, "P.O.R.T.S.," which describes the NOS Physical Oceanographic Real-Time System navigation aid.

Harbor Safety Committee of the San Francisco Bay Region. BCDC has been a member of the Harbor Safety Committee (HSC) since its inception in 1991. In 2004, the Commissioner who represents BCDC on the Committee was named Chair of the HSC, and has since spearheaded a number of tasks through the HSC work groups, including: an analysis of and response to legislation that was proposed to require tug escort of vessels carrying hazardous cargo in state waters; participation in planning for the implementation of a Bay Water Trail, which will designate kayak launch sites along the Bay shoreline, focusing on safe navigation and U.S. Coast Guard security requirements; and the San Francisco, San Pablo and Suisun Bays Harbor Safety Plan.

San Francisco, San Pablo and Suisun Bays Harbor Safety Plan. BCDC was integral to the recent revision of the *San Francisco, San Pablo and Suisun Bays Harbor Safety Plan*, which was first adopted in 1992. Annual updates have been made since that time; however, the plan was in need of thorough review and revision. The HSC's Chair and work group chairs comprised an ad hoc Harbor Safety Plan work group that undertook an extensive rewrite of the plan, which included revised maps and review of the plan's recommendations to further safe navigational standards in the Bay. The revised plan was accepted by the Administrator of the Office of Spill Prevention and Response in June 2005.

Upcoming Efforts. Legislation will soon be proposed in the state Senate to create a state task force to evaluate the need for tug escorts for vessels carrying hazardous material, and BCDC is expected to be named to participate in this task force, along with the Harbor Safety Committee. In response to recently adopted U.S. Coast Guard guidance, the Area Contingency Planning Committee has established a subcommittee to review and revise the Area Contingency Plan for spill response in the Bay. BCDC is a member of the subcommittee that will coordinate with the other California Area Committees in a statewide effort to meet the Coast Guard requirements.

Priority Objectives to Improve BCDC's Government and Energy Facilities Program. The Commission should improve its program for facilitating the siting of energy facilities and energy-related activities and government activities while maintaining current levels of coastal resource protection through refining its Bay Plan policies, such as by addressing:

- **Airport Planning.** By broadening BCDC's ongoing work with the Metropolitan Transportation Commission, the Association of Bay Area Governments, the Federal Aviation Administration and local airports to address an apparent need for expanded airport facilities along the Bay shoreline, the Commission will ensure that BCDC's airport policies reflect current information on the aviation industry in the Bay Area, consistent with the RASPA. It is critical that the Bay Plan findings, policies and priority use area designations reflect and respond to these changes in the aviation industry so that BCDC has the most up-to-date policy guidance when permitting future airport expansion projects. BCDC can maximize its time and effort in updating the RASPA, either as the lead or as one of the central agencies in RAPC, by updating the Bay Plan airport policies in conjunction with the RASPA work. The update of the Bay Plan policies continues to be important, especially with the changes in aviation industry security and demand since the 2000 RASPA amendment.
- **Water-Related Industry.** The Commission should improve its program for facilitating the siting of energy facilities and energy-related activities through refining its Bay Plan findings, policies, and priority use area designations pertaining to water-related industry. The Commission can work with the CEC to assess the specific needs for

petroleum infrastructure expansion in the Bay Area and supplement the contents of the CEC's 2007 Integrated Energy Report with this relevant information. Through this partnership, the Commission would benefit from the CEC's expertise in projecting energy demand and supply when updating the findings, policies, and priority use area designations pertaining to water-related industry.

Cumulative and Secondary Impacts (*High Priority*)

The federal program objectives address the need for development and adoption of procedures to assess, consider and control cumulative and secondary impacts of coastal growth and development, including the collective effect of various individual uses or activities on coastal resources, such as coastal wetlands and fishery resources.

Background. Comprised of 28 receiving watersheds, the San Francisco estuary includes the lands and waters within the boundaries of the immediate San Francisco Bay watershed, Suisun Marsh and the Sacramento-San Joaquin Delta. The estuary drains 60,000 square miles, or more than 40 percent of the state. Inland activities play an important role in maintaining the Bay's resources and will increase in significance with population growth and urban development. The many beneficial uses of San Francisco Bay depend on the quality of its waters, and impacts within each segment of the region can affect the health of the estuary in its entirety. Programs that address land use issues throughout the region are necessary if the Bay's beneficial uses are to continue and flourish.

BCDC's Cumulative and Secondary Impacts (CSI) Program

Table 7. Areas Subject to CSI Threats

Impact Area	CSI Threats
Subtidal areas of the Bay	(1) Central Valley development and agriculture: freshwater diversion and runoff. (2) Dredging and sand mining: sediment depletion and changes in bathymetry
Bay species composition and habitat	Port and water-related industry activity: invasive species
South San Francisco	Airport development: large Bay fill

- **Growth and Development.** Over the next three decades, the population in the state of California is projected to grow 40 percent—from 34 million in 2000 to 48 million by 2030. In the nine-county Bay Area region alone, the population will likely increase from 6.8 million in 2000 to 7.2 million by the end of 2005. By 2020 the population is expected to increase to 8.3 million.

State population growth, coupled with development of lands within the Bay-Delta region and beyond, can create a variety of adverse impacts on the estuary's environment. Loss of wetlands and other habitats, pressures to fill the Bay, daily inputs of pollutants, and increased diversion of fresh water flow and altered flow regimes, result from activities related to population growth. Impacts to wetlands and program efforts to address them are discussed in the Wetlands section of this assessment.

By reserving areas for uses that have a demonstrated need to be sited along the Bay and not releasing the entire shoreline for unrestricted development, the Commission averts pressures to fill the Bay for water-oriented uses once shoreline sites have been depleted. Permits for development proposed within these priority use boundary areas are granted or denied based on the appropriate Bay Plan policies that pertain to ports, water-related industry, water-oriented recreation, airports and wildlife areas.

With increased population comes heightened demand for development along the Bay as well as for greater access to the Bay and its shoreline. One of the Commission's primary mandates is to provide maximum feasible public access consistent with every project. Through this mandate, the Commission also plays a vital role in maintaining the scenic and recreational qualities of the Bay and shoreline. The Commission's public access program addresses impacts of individual development proposals, thereby working to supplement access provided by parks, fishing piers and marinas in order to open as much of the Bay and shoreline as possible to the public.

The title to the tide lands, submerged lands and tidewaters of San Francisco Bay and its tributaries, and living resources inhabiting these waters, is held by the State in trust for the benefit of the public. This property right establishes the right of the public to use and enjoy these trust waters, lands and resources for a wide variety of recognized public uses including navigation, commerce, natural resources and recreation. Although the State Lands Commission is the California agency with direct responsibility for exercising the public trust, BCDC also has responsibility for the public trust within its jurisdiction, which is mandated in its law and policies and incorporated into its CZMP. As population growth increases and development expands, pressure to fill tide lands for non-trust uses will persist.

- **Water Quality.** Sewage treatment and industrial discharges into San Francisco Bay were successfully reduced through water quality programs initiated in the 1960s and 1970s. With increasing population and continued expansion of impervious urban land surfaces, the major source of pollution in San Francisco Bay became urban and non-urban runoff or polluted runoff (nonpoint source pollution). Most recently, the scientific link established between tidal marsh and the methylation of mercury in the Bay has become a critical water quality issue.

The State Water Resources Control Board and the Regional Water Quality Control Board have primary authority over water quality in San Francisco Bay and set the beneficial uses of water in the Bay. However, BCDC maintains its separate water quality control authority under the McAteer-Petris Act and the Bay Plan recognizes the importance of maintaining water quality in San Francisco Bay at levels sufficient to protect the beneficial uses of the Bay and its resources. A number of Bay Plan policies are applicable to this end, particularly those addressed in the Water Quality, Fresh Water Inflow and Dredging sections of the Bay Plan. The policies, decisions, and authority of the State Water Resources Control Board and the Regional Water Quality Control Board provide the basis for the water quality responsibilities of the Commission. The Commission in its permitting process works closely with the Regional Board to further Bay water quality efforts.

- **Fresh Water Inflow.** Over the past forty-five years, the operation of large agricultural and urban water projects, such as the federal Central Valley Project and the State Water Project, has drastically altered the natural drainage flows of the Central Valley. In addition to increasing pollutant loading to the estuary from agricultural runoff, the annual diversion of the fresh water supply from the Bay and Delta affects water circulation, habitat conditions, species composition and overall geomorphology of the Bay.

Bay Plan policies support adequate fresh water inflow by including the following provisions: (1) diversions of fresh water should not reduce the inflow into the Bay to the point of damaging the oxygen content of the Bay, the flushing of the Bay, or the ability of the Bay to support existing wildlife; (2) high priority should be given to the preservation of Suisun Marsh through adequate protective measures including maintenance of fresh water inflows; and (3) the impact of diversions of fresh water inflow into the Bay should be monitored by the State Water Resources Control Board, which should set standards to restore historical levels of fish and wildlife resources. The Commission works with the State Board and others in an effort to maintain adequate fresh water inflows to protect the Bay.

- **Sedimentation and Dredging.** Each spring, the tributaries of the San Francisco Bay deposit fresh water laden with silt, sand, and clay sediment into the shallow Bay. Six to eight million cubic yards of material must be dredged from the Bay each year for the safe maintenance of harbors and navigation and flood control channels that contribute to more than \$5.4 billion of economic activity in the Bay Area annually.

BCDC regulates dredging and disposal of dredged material in the Bay, and has the dual mission of protecting the Bay's natural resources while fostering appropriate use of the Bay for maritime commerce and recreational boating. In reviewing permits for dredging and disposal of dredged materials, BCDC requires that a need for the activity to serve a water-oriented use or other important public purpose be demonstrated; that materials meet water quality requirements of the Regional Water Board; and that important fisheries and natural resources be protected. Whenever possible, disposal must take place in non-tidal areas where beneficial uses of the dredged materials can be realized, or in designated ocean sites. Disposal of dredged materials in the Bay is allowed at sites designated by the Commission and the U.S. Army Corps of Engineers only when non-tidal and ocean disposal have proven infeasible.

BCDC joined with other agencies in a cooperative arrangement to formulate a Long Term Management Strategy for dredging and dredged material disposal (LTMS). The LTMS will serve as a comprehensive dredging and disposal management plan and implementation program. BCDC is responsible for the study of upland disposal of dredged material, with emphasis on the use of dredged material as a resource. The Corps of Engineers is responsible for overall management of the LTMS. The LTMS provides uniform federal and state dredged material disposal policies and regulations, and serves as the basis for recent amendments to the Bay Plan dredging policies.

Conclusions of Previous Assessment. The 2000 Assessment and Strategy identified several objectives that would address impacts to the Bay created by state growth and development, all of which involved collaboration and partnerships with agencies, interest groups, and the public to better coordinate and manage planning efforts important to the Bay Region. The objectives included programs to address the following issues related to cumulative and secondary impacts: transportation, recreation, water quality, freshwater inflow, water surface area and volume, priority use areas, habitat restoration, and invasive species. The Commission also identified additional opportunities to analyze and address cumulative impacts by assessing and monitoring polluted runoff and developing a permit tracking system. In the previous Assessment the Commission ranked its cumulative impacts program as a high priority enhancement area and included numerous program changes to improve this program. Many of these program changes were achieved. However, the Bay Plan policies on freshwater inflow, water surface area and volume, and invasive species have not yet been updated. Therefore, BCDC's cumulative impacts program remains a high priority enhancement area.

Changes in BCDC's Cumulative Impacts Program since Previous Assessment

- **Regional Collaboration.** The Commission has been at the forefront of efforts to promote and facilitate greater regional collaboration between agencies and organizations that protect Bay resources. The Commission has generally found that by collaborating with the appropriate agencies on planning projects, it can leverage funding to develop program changes and planning tools that benefit all partners. Similarly, by working together in the permit review process, agencies can achieve more comprehensive project analysis and more efficient project review. Thus, the Commission continues to lead efforts for greater regional collaboration and it is through collaborative efforts, such as those listed below, that the Commission has been so successful in addressing cumulative and secondary impacts of growth and development.

1. In the 1980's, the Commission was a core member of the Wetlands Restoration Program, a multi-agency approach to implementing the Baylands Ecosystem Habitat Goals Report. The Wetlands Restoration Program envisioned the Comprehensive Conservation and Management Plan for the Bay as one of the tools for implementation. BCDC continues to participate at the core of a number of regional partnerships that grew from this effort.
2. In the 1990's, in partnership with the Army Corp of Engineers, the Regional Water Quality Control Board, and other agencies, the Commission developed a regional Long Term Management Strategy (LTMS) aimed at reusing dredged materials in San Francisco Bay. Both the Hamilton Wetlands Restoration Project and the Dredged Material Management Office are examples of collaborative projects that emerged from the LTMS process. The Dredged Materials Management Office functions as a "one-stop-permit information shop" for dredging permit applicants who, depending on the proposal, would otherwise submit separate permit applications with 3 to 5 separate agencies. The DMMO agencies meet to determine what information is needed from the applicants to analyze specific dredging proposals. Although as many as five separate permits may be required for a dredging proposal, the DMMO has a single dredging permit application form that will be accepted by all DMMO agencies.
3. In July 2000, the Commission joined the other regional agencies—the Association of Bay Area Governments, the Metropolitan Transportation Commission and the Bay Area Air Quality Management District—and partners from the business and environmental communities, to develop alternative regional growth strategies for the Bay Area and to foster support among public officials, civic leaders and stakeholder groups. NOAA provided technical assistance to undertake planning for sustainable development in the region. Under a two-year partnership, a NOAA representative coordinated with and represented the interests of NOAA and BCDC in discussions with partner organizations in developing policies conducive to "smart growth" in the Bay Area. BCDC also provided the Association of Bay Area Governments \$90,000 in Coastal Impact Assistance Program funds to retain consultants needed by the Smart Growth partnership. The regional agencies were joined by the Bay Area Alliance for Sustainable Communities and out of this merge came the Bay Area Smart Growth Strategy /Regional Livability Footprint Project.

The joint Project sought to engage locally elected officials and their staffs, private developers, stakeholder group representatives, and the public at large throughout the nine-county Bay Area to:

- Create a smart growth land use vision for the Bay Area to minimize sprawl, provide adequate and affordable housing, improve mobility, protect environmental quality, and preserve open space;

- Identify and obtain the regulatory changes and incentives needed to implement this vision; and
- Develop 20-year land use and transportation projections based on the vision and the likely impact of the new incentives—projections that will in turn guide the infrastructure investments of the Metropolitan Transportation Commission and other regional partners.

In 2003, the Congress for the New Urbanism honored BCDC and its partners with a Charter Award of Excellence for the Smart Growth Strategy/Regional Livability Footprint Project.

4. Beginning in 2003, the Commission initiated a public access and Bay Trail planning project (described in detail in the public access section) with the two regional agencies that provide Bay Trail and public shoreline access—the Association of Bay Area Governments (ABAG) and the Bay Region of the California Coastal Conservancy (Bay Conservancy). BCDC provided coastal impact assistance funds to ABAG to collaborate on developing a comprehensive signage program, funding additional field research on the compatibility of wildlife and public access, and launching a new public shoreline website that provides maps and detailed information about Bay Trail and public access areas around the Bay. The Bay Conservancy is planning on adding the information from its Bay Shoreline Guide to the website at a future date.

Integrated Strategic Planning. For the past decade the Commission has developed annual strategic plans that set the basic direction BCDC would take by establishing clear goals and objectives. These plans have had a major impact on how the Commission has addressed critical issues and conducted its business. For example, past strategic plans have resulted in all of the following: support for the establishment of the Bay Area Conservancy Program; a number of investigations of better means of financing BCDC's operations; adoption of a comprehensive public outreach program; participation in the CALFED Bay-Delta Program; an ongoing program for updating the Bay Plan; formal briefings for new Commissioners; legislative amendments to improve BCDC's enforcement program; increases in BCDC's permit fees; the San Francisco Waterfront Special Area Plan; and participation in the regional smart growth strategy. Every five years, coinciding with the Section 309 Assessment and Strategy, the strategic planning process is integrated to the greatest extent feasible with the planning process for the Assessment and Strategy.

The Commission's strategic planning is seen as being highly successful in establishing the general direction, overall goals and shorter-term objectives the Commission wants to accomplish. Building on this successful approach, the Commission is uniquely positioned to make its strategic planning even more strategic by taking the lead in working with other public agencies or regional organizations to develop a single integrated strategic plan that could be used by BCDC and the other entities that play roles in defining the future of the Bay Area. In October 2005, the Commission committed to developing its next strategic plan update in partnership with one or more other organizations that share the Commission's conclusion that integrated strategic planning would be beneficial.

- **Transportation.** In response to pressures to relieve traffic congestion in the Bay Area, the Commission approved an update to the Bay Plan policies on transportation on October 20, 2005. Pressures to relieve traffic congestion have resulted in proposals to increase the number of bridge crossings over and/or BART tunnels under the Bay. Increased ferry transportation in the region presents an alternative solution that the state legislature embraced by creating the San Francisco Bay Area Water Transit Authority (WTA) to expand ferry transportation on San Francisco Bay. The WTA is exploring ways to

significantly increase the number of terminals and the number of vessels that can carry commuters across the Bay. BCDC worked together with both the WTA and the Metropolitan Transportation Commission to identify appropriate sites for terminals and consider such factors as the amount of dredging required to maintain water depths sufficient to accommodate ferries, proximity to wetlands and other sensitive habitats, proximity to landside transportation and potential effects on adjacent communities. In conjunction with these efforts, in October 2005 BCDC updated the transportation policies and developed new policies to support the expansion of Bay ferry transit and address pressures to fill the Bay for transportation infrastructure. This work

- **Water Quality.** In 2001 the Commission included in its four-year strategy a plan to work with the scientific community, resource agencies—notably the Regional Water Quality Control Board and the CALFED Bay-Delta Program—to refine Bay Plan policies that address water quality, fresh water inflow, and water surface area and volume. The Commission determined that these Bay Plan policies should reflect current scientific knowledge in a number of areas, including nonpoint source pollution and the updated Regional Water Quality Control Board’s Basin Plan for the Bay. The Commission continues to participate in efforts to curb nonpoint source pollution to the extent that funding allows. Funding for the Commission’s work on water quality is provided through a Coastal Zone Management Section 310 grant.

Water Quality Policies. In July 2001, the Commission adopted a fiscal year 2001-02 work program that included the review and possible update of the Bay Plan water quality findings and policies focusing on nonpoint source pollution control. During the following year, the Commission staff conducted research, analyzed the effect of nonpoint source pollution on San Francisco Bay in coordination with the State Water Resources Control Board, San Francisco Bay Regional Water Quality Control Board, San Francisco Estuary Institute, California Coastal Commission, and the U.S. Environmental Protection Agency, and prepared a report entitled *Water Quality Protection and Nonpoint Source Pollution Control in San Francisco Bay* (September 2002). BCDC held a public hearing on the report and proposed Bay Plan policies and extended the public hearing based on public comments so that the staff could continue working with local governments and other interested parties to refine the report and staff proposed Bay Plan policies. The staff subsequently revised the report in and republished the document in May 2003. The final staff report identified: (1) the nonpoint source pollution problems in the Bay and (2) the strategies and controls to prevent and reduce nonpoint source pollution of the Bay. The staff recommended that the Commission amend the Bay Plan water quality findings and policies regarding nonpoint source pollution with specific new findings and policies regarding the avoidance, and where avoidance is not practicable, minimization of nonpoint source Bay pollution. The Commission adopted the staff recommended Bay Plan water quality findings and policies in June 2003.

Nonpoint Water Pollution Control. BCDC’s staff participation in nonpoint source pollution program focuses on participation in the work of the statewide Interagency Coordinating Committee (IACC) and subcommittees and the Critical Coastal Areas Committee (CCA). The purpose of the IACC is to promote collaboration between state agencies to prevent and where prevention is unattainable, control nonpoint source pollution in the state. In the collaborative process, BCDC’s staff provides input to state agency regarding their proposed work products that are designed to implement the *California Plan for Nonpoint Source Pollution Control* (California Plan). Due to a cut in the amount of the federal Section 310 grant, BCDC staff has curbed its participation in the IACC Marina Subcommittee and the sub-workgroup of the Subcommittee that is addressing copper antifouling paint activities in the

State. BCDC has further curbed its participation in the IACC Wetland and Hydromodification Nonpoint Source Subcommittee formed to collaboratively identify and address wetland and hydromodification objectives to help implement the California Plan.

BCDC remains an active participant in the Critical Coastal Areas Committee and leads the work of the CCA in San Francisco Bay. BCDC recently held workshops in partnership with the Coastal Commission and the Regional Board to select a CCA pilot project, for which the agencies are seeking funding and drafting a scope of work. With adequate funding, BCDC will play a major role in the pilot project.

Marina Water Quality Study. In August 2002, BCDC received a National Oceanic and Atmospheric Administration Coastal Management Fellow to work collaboratively with key federal, state, and local environmental protection and management agencies and recreational boating organizations, and marina operators to coordinate the development of a voluntary water quality monitoring pilot study for selected marinas in San Francisco Bay and to make recommendations for additional studies and/or pollution prevention measures based on the results of the pilot study. The objectives of the pilot program were: (1) to establish baseline information, through literature review, data compilation and collection, on the condition of selected marinas in San Francisco Bay regarding selected pollutants, to provide a better understanding of existing water quality conditions at marinas in San Francisco Bay; and (2) to Use monitoring information to better identify pollutants of concern, to measure the degree of contamination and identify where pollution does and does not occur, and to set priorities for nonpoint source pollution prevention and control.

The NOAA Coastal Management Fellow conducted a comprehensive literature search and review. To supplement the literature review, original research at four selected Bay marinas was conducted. BCDC contracted with the Moss Landing Marine Laboratories, a consortium of the California State University system located in Moss Landing, to conduct the water quality sampling and analysis and help design the research process and protocols. The study was also guided by two advisory Committees formed and lead by the NOAA Coastal Management Fellow: the San Francisco Bay Marinas and Recreational Boating Nonpoint Source Task Force and the Marina Technical Advisory Committee. During the spring and summer of 2004, Moss Landing Marine Laboratories collected and analyzed sediments from the four sampled marinas. The study found that pollutants of concern such as copper, chromium and zinc were present in each marina but were not present at a level that could be considered extreme or highly risky to aquatic life. However, it was determined that if these pollutants were permitted to accumulate in marinas, then they could pose an extreme risk to aquatic life. Therefore, the NOAA Fellow concluded, the continuation of management practices known to eliminate or control pollutants entering the Bay from marinas and recreational boating operations should be continued as a condition required by the Commission in all marina permits.

Methylmercury. High levels of mercury can be found in the San Francisco Bay. While mercury in its inorganic form is essentially harmless to humans and other species, mercury in its organic form, known as methylmercury, poses a serious threat in certain estuaries. The Bay is one of several estuaries in the United States where mercury contamination poses a serious threat to human health and safety and the health of species in these estuaries. The Bay has received most of its mercury from past mining practices and continues to receive mercury from urban runoff and atmospheric deposition. Only a small proportion of this inorganic mercury is ever converted to methylmercury. Scientists are currently focusing on trying to find out

what factors contribute to the formation of methylmercury. Once those factors are identified, resource managers may be able to use this information to control the production of methylmercury and keep the contamination out of the food chain. The current studies are focusing on tidal marsh environments, as it is these environments that have been identified as areas with some of the highest amounts of methylmercury. BCDC staff have communicated with the scientists working on this issue and these scientists have indicated that an important piece of the puzzle could be found by monitoring tidal marsh restoration projects around the Bay using consistent protocols. BCDC staff has drafted a report that summarizes the findings to date on methylmercury contamination in the Bay and will recommend a Bay Plan amendment to address this issue. The Commission will consider the report and recommended Bay Plan amendment in January 2006. In the interim, any permits that are issued for marsh restoration projects will include a condition requiring monitoring for methylmercury.

- **Water Surface Area and Volume.** Dissolved oxygen supports marine life and helps break down pollutants in the water. The amount of oxygen in the Bay is determined, in part, by the surface area of the Bay oxygen is absorbed from the air. In addition, churning waves trap oxygen from the air and exposed tidal flats produce and absorb oxygen and transfer it to the water when the tide comes in.

The mechanisms for transmitting dissolved oxygen throughout the Bay are integrated in a complex system of interdependent variables, such as water circulation, tidal energy, fresh water inflow, and bathymetry. The mechanisms for sustaining dissolved oxygen are equally complex, requiring water pollution control and adequate water circulation through the entire water column.

At the time that BCDC was created, a large percent of the original surface area of the Bay has been diked off or filled. The diking and filling involved some of the most effective oxygenation areas, which compromised the ability of the Bay to take up oxygen. BCDC was created largely in response to this loss of water surface area and volume. However, the Bay Plan policies on Water Surface Area and Volume are now out of date, having never been updated. There is new scientific information about the important relationships between water surface area and volume, water circulation, fresh water inflow, bathymetry, and water pollution. In addition, as a result of accelerated sea level rise due to global climate change, the surface of the Bay will expand and some of the most effective oxygenation areas may become tidally inundated, thereby impacting the nature of oxygenation in the Bay. Finally, with the extensive restoration efforts underway in the Bay, the Bay Plan policies on Water Surface Area and Volume should be updated to incorporate new scientific information and provide clear policy guidance for restoration projects.

- **Fresh Water Inflow.** Most of the fresh water entering the Bay flows from the Delta and mixes with the salt water of the ocean flowing into the Bay through the Golden Gate. The relationship between fresh and salt water helps to determine the ability of the Bay to support a variety of aquatic life and wildlife in and around the Bay, such as anadromous fish as they progress upstream toward their spawning grounds and, later, for their fingerlings as they descend to salt water. Fresh water flow is especially important in maintaining the health of the Suisun Marsh, the largest remaining marsh around the Bay and a waterfowl habitat of nationwide significance.

New sediment is transported to the Bay from fresh water inflow and is needed to form new and sustain existing tidal marsh and tidal flats. As a primary source of sediment entering the Bay, upstream diversions of fresh water inflow directly impact the sediment budget in the Bay. This could have a detrimental affect on the development of restoration sites into viable tidal marsh. For all of these reasons, fresh water inflow impacts decisions about which lands to acquire for restoration as well as the design of restoration projects.

Fresh water is diverted from the Sacramento and San Joaquin Rivers by state and federal water projects for agricultural uses and use by local water districts. As the state population grows, there is potential for more fresh water to be diverted to serve quickly developing areas in the Central Valley. The State Water Resources Control Board is responsible for setting salinity standards in the Suisun Marsh, the Delta, and the Bay and it administers the CALFED program. State funding is provided so the Commission can actively participate in the CALFED Bay-Delta protection program that is attempting to resolve the issues surrounding state and federal water diversions. The CALFED efforts have produced new scientific information about the role of fresh water diversions in the estuary that should be incorporated into the Bay Plan findings and policies.

In addition, climate change scientists believe that global climate change can have significant impacts on California's supply of fresh water as global warming may result in earlier snowmelts in the Sierra Nevada Mountains and changes in the percent of precipitation falling as snow. The Sacramento and San Joaquin Rivers are the major drainage corridors for the Sierra Nevada Watershed. With the majority of the state's water needs served by the this watershed, global warming may require significant changes in the amount and timing of fresh water that is diverted from the Bay.

The Bay Plan policies on fresh water inflow have not been updated since 1982, long before the CALFED process was initiated. Because the amount of fresh water that enters the Bay through tributaries affects the overall species composition and geomorphology of the Bay, there is a need to evaluate the fresh water inflow policies in the Bay Plan and develop a work program to update the findings and policies.

CALFED. The CALFED Bay-Delta Program is a federal-state partnership to develop an integrated system to better manage the natural and economic resources of San Francisco Bay and the Sacramento-San Joaquin River Delta. This cooperative effort was established in June 1994 and pledges the state Department of Fish and Game, Department of Water Resources, and the State Water Resources Control Board, with the U.S. EPA, Fish and Wildlife Service, Bureau of Reclamation, and the National Marine Fisheries Service, to work together in three areas of Bay-Delta management: (1) water quality standards development; (2) State Water Project and federal Central Valley Project operations coordination; and (3) development of long-term solutions to Bay-Delta estuary resource problems.

The Bay-Delta Advisory Council—comprised of 30 citizens appointed to represent California's agricultural, environmental, urban, business, and fishing interests—advises CALFED on its mission, the issues it should address, and its objectives. CALFED established a three step process for carrying out its mandate: (1) problem definition and a range of alternative solutions; (2) state and federal environmental documents to identify the impacts of each alternative solution; and (3) final environmental documentation of the impacts of the selected alternative. Urban and agricultural water users, sport and commercial fishing interests, environmental and business organizations, other interested organizations, and the general public are actively involved in the CALFED program.

The Commission followed the CALFED program closely and approved a federal consistency determination for the CALFED program. The Commission and the Coastal Conservancy also jointly applied for and received a \$1 million CALFED Ecosystem Restoration Project grant for the Hamilton Wetlands Restoration Project and Commission staff continue to work with CALFED staff on dredged material beneficial reuse projects in the Suisun Marsh and Sacramento-San Joaquin Delta Island levees. The Commission is committed to continuing its work with CALFED and has been processing permits and consistency determination applications for projects needed to implement the CALFED program within the Commission's jurisdiction.

- **Invasive Species.** The San Francisco Bay-Delta is the most invaded aquatic ecosystem in North America, and may be the most invaded estuary in the world. Not only is the number of invasive species increasing, but the rate of invasion is also increasing. From 1851 to 1960, the average rate of invasion of the bay was one new species every 55 weeks; from 1961 to 1995 the average rate increased to one new species every 14 weeks. To date, BCDC has only been peripherally involved in this issue, while a number of government agencies and non-profit organizations have taken the lead. For example, the State Lands Commission is responsible for administering the Marine Invasive Species Act, in part, by regularly inspecting approximately 25 percent of all vessels entering the Bay for required Ballast Water Management Plans and ballast water logs. However, ballast water is not the sole source of nonnative species in the Bay and the shoreline and substantive actions need to be taken to curb the current rate of introduction. BCDC is scheduled to commence revisions to the Shoreline Landscape Guide, which contains planting guidelines to address invasive plant issues on the shoreline. Additional efforts to address invasive species could include the following measures: (1) analyzing the existing invasive species programs of other organizations to determine how BCDC can best assist in the effort to stop the introduction of invasive species; (2) analyzing the Bay Plan policies pertaining to invasive species and updating the Bay Plan policies; and (3) if needed, developing a coordinated approach to advocating and providing education on invasive species issues.
- **Recreation.** In 2000, the Commission identified a need to comprehensively update the recreation policies and priority use area designations to respond to regional population growth, protect the Bay from development pressures, and respond to new forms of water-oriented recreation demands. In 2002, the Commission updated a specific recreation policy pertaining to future recreational uses at closed military facilities. However, the recreation policies had not been comprehensively reviewed and updated since the Bay Plan was adopted and, consequently, in 2004 BCDC initiated, with CZM funding assistance, the review and update of the Bay Plan recreation policies. Specifically, the update seeks to: (1) comprehensively address the increasing demand for waterfront parks and recreation uses in and around the Bay; (2) address changing demand for recreational uses based on the changing Bay Area demographics and popularity of new kinds of water sports; (3) respond to the need for revenue generating commercial recreation facilities in shoreline parks to help finance the acquisition, improvement and maintenance of shoreline park facilities; (4) analyze the uniform application of the recreation policies to federal and non-federal lands; (5) incorporate policies that address new kinds of water-oriented recreation not now covered in the Bay Plan, such as the Bay Water Trail and small craft water sports like sail boarding; (6) determine whether or not the shoreline parks designated in the Bay Plan will be acquired and developed for park purposes by public agencies and, if not, whether these sites should be deleted from the Bay Plan; and (7) determine whether new shoreline parks should be designated as priority use areas on the Bay Plan maps. The project is funded through a Section 309 grant and is scheduled for completion in December of 2005.

- **Data Systems and Performance Indicators.** The Commission developed a text-based Permit Tracking System (PTS) database that can, in addition to supporting routine permitting work, yield access to summary information about development activities on a regional scale and provide valuable data for future Bay Plan policy updates. The Commission's permit files, taken together as a whole, represent the most complete and authoritative record of 35 years of shoreline development around the San Francisco Bay. These data, which exist nowhere else in such comprehensive form, are a "hidden" resource that the Commission and its partner agencies could use to support planning studies and analyses, if the information could be accessed and manipulated effectively. For example, the data could provide an objective measurement of certain types of permit activities that, if combined or compared with outside analyses, may suggest or support new directions in shoreline planning or, conversely, conserve effort and costs by quickly identifying trends not taken into account in initial studies.

PTS is now populated with permit data from 2003 to the present and the Commission is attempting to secure funding to populate the system with all permit data from 1965 through 2002. PTS and the Bay Resource Analysis Tool (BayRAT) were developed to be compatible data systems, one text based and the other based on spatial data. With minor modifications to both systems, the detailed permit data can be merged into BayRAT's GIS to create one system that can more effectively provide permit data. Additional minor modifications could be made to generate data for NOAA's performance indicators. BCDC's current assessment of a combined systems' ability to respond to the performance measures for public access and government coordination topic areas indicates that only two modifications to the data input process would be necessary. An initial assessment of the indicators in the habitat topic area suggests that additional modifications would be necessary to generate the required data.

Priority Objectives to Improve BCDC's Cumulative Impacts Program. The Commission should develop policies and programs to address impacts to the Bay created by growth and development by building on its successful track record in collaborating with agencies, interest groups and the public to better coordinate and manage planning efforts important to the Bay region. These efforts could be pursued in a number of ways, including:

- **Water Surface Area and Volume.** As part of its effort to develop and implement a comprehensive program that addresses cumulative and secondary impacts of growth and development, the Commission should update the Bay Plan findings and policies pertaining to water surface area and volume. The water surface area and volume findings and policies to be updated to: (1) incorporate new information about the important relationships between water surface area and volume, water circulation, fresh water inflow, bathymetry, and water pollution (2) recognize the potential impacts of global climate change on the chemical and hydrological functions of water surface area and volume; and (3) provide clear policy guidance for the extensive areas of the Bay planned for restoration.
- **Fresh Water Inflow.** As part of its effort to develop and implement a comprehensive program that addresses cumulative and secondary impacts of growth and development, the Commission should update the Bay Plan policies on fresh water inflow. The Bay Plan policies on fresh water inflow have not been updated since 1982, long before the CALFED process was initiated. Because the amount of fresh water that enters the Bay through tributaries affects the overall species composition and geomorphology of the Bay, there is a need to evaluate the fresh water inflow policies in the Bay Plan and develop a work program to update the findings and policies to: (1) incorporate new information about the role of fresh water in the Bay; (2) incorporate new information about the impacts of global climate change on fresh water supply and potential diversions; to analyze and address recent CALFED decisions and initiatives and incorporate information pertaining to BCDC's jurisdiction.

- **Invasive Species.** The Bay is considered the “most invaded Estuary in the world.” The cumulative impacts of introduced invasive species are the primary threat to the Bay’s biodiversity, with new species introduced at a rate of one every twelve weeks. BCDC should further improve its program by addressing the cumulative and secondary impacts of growth and development by updating the Bay Plan findings and policies pertaining to invasive species. BCDC should develop an invasive species program that includes the following: (1) analyzing the existing invasive species programs of other organizations to determine how BCDC can best assist in the effort to stop the introduction of invasive species; (2) analyzing the Bay Plan policies pertaining to invasive species and potentially developing new Bay Plan policies; and (3) developing a coordinated approach to advocating and providing education on invasive species issues.

Additional Opportunities for Improvement. In addition to the kinds of Bay management partnership efforts discussed above, the Commission could further its program to control impacts of growth and development through such actions as:

- **Data Systems and Performance Indicators.** The Commission can further improve its program on cumulative and secondary impacts of growth and development by refining and merging two data systems—PTS and BayRAT—to provide 40 years of detailed permit data in a GIS and enable the Commission to generate data in response to NOAA’s performance indicator requirement. Merging PTS and BayRAT would require additional input of past permit actions and minor modifications. Additional modifications, although minor, would also be required to generate data for performance measures. However, the data generated from a combined data system would not only be useful for NOAA’s performance indicator program, but for securing state general funds and support for BCDC’s program from the state legislature.

Public Access (*High Priority*)

Section 309 Programmatic Objectives. Three federal Section 309 programmatic objectives for public access that apply to BCDC’s public access program include: (1) improving public access through regulatory, statutory, and legal systems; (2) developing or enhancing a Coastal Public Access Management Plan which takes into account the provisions of public access to all users of coastal areas of recreational, historical aesthetic, ecological and cultural value; and (3) minimizing potential adverse impacts of public access on coastal resources and private property rights through appropriate protection measures.

BCDC’s Public Access Program. The authority for BCDC’s public access program is specifically granted by Section 66602 of the McAteer-Petris Act, which states, in part, “that existing public access to the shoreline and waters of the San Francisco Bay is inadequate and that maximum feasible public access...should be provided.” The foundation for the Commission’s public access program lies in the findings and policies of the Bay Plan, which establish that shoreline areas not needed for designated priority uses are to be developed in ways that do not preclude public access to the Bay.

BCDC’s public access program consists primarily of attaching conditions to permits for Bay fill and for development within the 100-foot shoreline band that require that access be provided on a permanent basis. The McAteer-Petris Act (Section 66632.4) grants BCDC the authority to deny permit applications for projects that fail to provide maximum feasible public access, consistent with the proposed project, to the Bay and its shoreline. The phrase, “consistent with the proposed project,” has required that the Commission establish a nexus between the public access burden created by an individual project and the public access exaction required by the Commission.

The Design Review Board (DRB), comprised of landscape architects, architects, planners, and engineers, serves as a voluntary advisory board that ensures high quality public access areas by evaluating the design aspects of specific projects for which a permit or consistency determination is needed. While the Commission ultimately determines whether a project provides maximum feasible public access, the DRB assists the Commission by evaluating the quantity and quality of public access proposed for all permit applications with significant public access issues and advises the Commission on these matters. The DRB typically recommends design changes to ensure that proposals provide attractive and usable public spaces and provides advice on whether fill for a proposed public access improvement would be appropriate.

Characterization of Existing Public Access. Since the 2000 Assessment and Strategy, the Commission developed two data systems for facilitating project tracking and both quantitatively and spatially assessing the current status of public access to the Bay. The Permit Tracking System (PTS) provides detailed tabular text data on specific permit actions. The Bay Resources Analysis Tool (BayRAT) provides geospatial data about general permit actions in the context of land use data obtained from other agencies and organizations. Both systems have increased the Commission's ability to quantitatively assess its programs. This is especially true for its public access program as the systems can provide up-to-date information about the status of a Commission-required public access site as well as a map showing the location of the public access. Table 8 includes data from both PTS and past annual reports.

Table 8. Public Access Required By Permit Conditions

Year	Public Access Acres	Public Access Miles	Public Access Sites*
2001	34.8	11.1	NA
2002	2.5	0.5	NA
2003	28.8	3.8	19**
2004	11.2	1.5	21**
2005	NA	NA	NA
Total (2001-2004)	77.3	15.9	NA
Total (1965-2004)	938	95.7	NA

* A "site" is a public access area approved through a specific permit action.

**Numbers are approximate until Permit Tracking System data entry is complete.

Preliminary analysis from the Commission's research from the Bay Plan recreation policy update indicates that the demand for water-oriented recreation opportunities is increasing corresponding to regional population growth and population density. It is also diversifying. The population in the nine-county Bay Area region is projected to increase from 6.8 million in 2000 to 7.2 million by the end of 2005. By 2020 the population is expected to increase to 8.4 million. In addition, five of the eight most densely populated counties in the state are located in the Bay Area. These population increases coupled with high urban densities have led to a greater need for respite in open space areas, including on the Bay and along its shoreline.

In addition to the basic needs for respite from urban densities, the Bay Area enjoys a quality of life that will decline if the supply of open space and shoreline access opportunities do not keep pace with population growth. The Bay Area has some of the highest average incomes and one of the most educated populations in the country. High incomes and education typically correspond to greater demand for recreation and open

space areas. Additionally, two of the fastest growing forms of recreation in the US and in the Bay Area are birding and kayaking, creating an even greater demand for public access to the Bay. An accounting of Bay Area shoreline parks, shoreline trails, and recreation amenities is shown in Table 9.

Table 9. Bay Area Shoreline Access Overview

Public Access, Parks, and Amenities	
Access Type	Current Number(s)
Recreation Priority Use Areas*	56 Parks and Open Space Areas
Bay Trail	250 miles
Public Power Boat Ramps	32 Ramps
Kayak/Canoe Launch Sites	80-86 Launch Sites**
Fishing Piers**	75 Piers

*Includes national, state, regional, and local parks, the accounting for which is currently being adjusted through the recreation policy update.

**Launch sites may include power boat ramps.

Conclusions of Previous Assessment. The federal 309 Assessment and Strategy completed in 2001 designated public access as a priority enhancement area and identified two priority objectives as well as three “additional opportunities” to improve BCDC’s public access program. The two priority objectives built on BCDC’s in-depth, two-year research and policy development process that concluded in March 2001, with the Commissions approval of revisions to the Bay Plan public access findings and policies to better reflect current knowledge on the interactions of public access and wildlife. To aid in the application of the updated public access policies, the two priority objectives included: (1) updating the Public Access Design Guidelines to incorporate siting, design and management strategies to avoid or reduce adverse impacts on wildlife; and (2) identifying sensitive habitat areas by funding a third year of field research and implementing a geographic information system with habitat and public access data layers.

The “additional opportunities” to improve the public access program included the following: (1) updating the *Shoreline Landscape Design Guidelines* to develop landscaping strategies to avoid or reduce adverse impacts on wildlife and incorporate new information in landscape design; (2) improving BCDC’s public shoreline signage program; and (3) ensuring that major projects with public access components provide public access for all potential users, including those with disabilities.

In the previous Assessment the Commission ranked its public access program as a high priority enhancement area and achieved almost every public access objective. BCDC’s public access program remains a high priority for the following reasons: (1) public access is one of BCDC’s primary responsibilities under the McAteer-Petris Act; (2) there are public access projects that require continued efforts to maintain data systems and follow through to their completion; (3) there is a need to update the *Shoreline Landscape Design Guidelines*; and (4) there is a continued need for more scientific information regarding public access and wildlife compatibility,

Changes in the Public Access Program Since the Previous Assessment

- **Public Access Design Guidelines.** In April of 2005, the Commission adopted revised and updated *Public Access Design Guidelines* (Design Guidelines). The Design Guidelines provide examples of siting, design and management strategies to assist permit applicants, developers, and design professionals to design and develop attractive, usable and safe public access as part of their projects. In addition to incorporating groundbreaking public access and wildlife compatibility information into the updated Guidelines, the staff reevaluated and updated other areas of the current Guidelines to reflect recent trends in site development and the design of shoreline access areas.

A draft document was provided to developers, design consultants, local and regional government agencies and the environmental community for input and comments. Beginning in August 2004, the Commission's Design Review Board reviewed two drafts of the revised guidelines before the revised Design Guidelines were adopted by the Commission in April 2005. The update of the Guidelines was funded using Coastal Impact Assistance Program money.

- **Sensitive Habitat Area Identification.** The 2000 Assessment and Strategy identified two program changes that would increase the Commission's ability to assess any impacts of public access on wildlife. The Commission developed BayRAT and contracted second and third-year studies on public access and wildlife compatibility to address the following issues: understanding if public access adversely affects wildlife and, if so, which species and how, and; determining if public access can be provided near habitats of sensitive species and, if so, how the access should be sited, designed, constructed, and managed to avoid or minimize habitat degradation and impacts on wildlife. These questions are particularly important when considering providing public access as part of habitat restoration projects. BCDC addressed this need by developing BayRAT and contracting second and third year studies on public access and wildlife compatibility.
 1. **Bay Resource Analysis Tool (BayRAT).** In 2003, the Commission developed and implemented BayRAT to identify, obtain, configure and distribute geospatial data, including existing data from outside agencies and organizations as well as new data developed from the Commission's files, to expand the analysis and research capabilities of the Commission. BayRAT is a comprehensive access and management tool that includes data on Bay habitat types, the presence of endangered species, and the location of wildlife areas, marinas, parklands, and public access, that is mapped in a series of overlays in a geographic information system (GIS). Specifically, BayRAT provides staff with access to geospatial data in an easy to use format on their individual desktop computers, enabling Commission staff to effectively and efficiently gather and analyze multiple types and sources of information for better informed planning policy and regulatory functions. The development and implementation of BayRAT was funded using CZMA Section 309 grant money.
 2. **Wildlife and Public Access Field Research.** The wildlife and public access field research was completed in June 2005 in response to a continued need for additional information to better understand the effects of public access on wildlife and ensure that future siting, design, and management of public access, including the Bay Trail, minimize any adverse impacts on wildlife. BCDC and the Association of Bay Area Governments (ABAG) worked in partnership to design a wildlife and public access scientific field research plan to generate quantitative and statistically testable data on the impacts of trail users on birds in the tidal marshes of San Francisco Bay. Independent consultants installed the study quadrants, and hired and trained site observers and supervisors to collect

data. After a full year of field research had been completed and the data were analyzed, the Commission provided additional funding to extend this important field research for another year. The field research was completed in June 2005 and a third year of research commenced shortly thereafter. The partnership with ABAG and the extension of the original field research are funded using CIAP money.

3. **Wildlife and Public Access Compatibility Needs.** The Commission's most recent efforts to address the provision of public access near wildlife habitat in a manner that preserves habitat and wildlife values have included: a two-year public access policy update effort to require implementation of measures that address disturbance and compatibility, including avoidance; expending Coastal Impact Assistance grant funds for a collaborative stakeholder process to develop public access proposals as part of a 20,000-acre wetland restoration project, revising the Commission's *Public Access Design Guidelines* to better inform project designers of the siting design and management strategies that can avoid or reduce impacts from public access on sensitive wildlife; and funding a third year of scientific field research into the impacts of recreational trails on foraging shorebirds; and guiding a multi-agency process for the Hamilton Airfield wetland restoration, in part, to ensure that wildlife compatible public access was integrated into the project design.

There are several large-scale wetland restoration projects in the planning and implementation stages in San Francisco Bay, totaling over 30,000 acres. These projects have the potential to add significantly to the public access opportunities in the region. Some of these projects lack sufficient funding to enable the sponsors to engage the public and responsible public agencies in a collaborative manner to determine how to maximize public access opportunities as part of these projects. The Commission is ideally suited to assist or lead in the implementation of stakeholder processes to address the public access opportunities and challenges that these significant restorations projects represent. For example, the Commission used Coastal Impact Assistance Program grant funding for a collaborative stakeholder process to develop public access proposals as part of a 20,000-acre wetland restoration project. The proposals will continue to be developed in concert with the restoration program's adaptive management approach.

- **Signage Program.** In July 2005, the Commission reviewed a new signage program that expanded the focus of the previous signage program, which merely identified public shoreline access areas required by Commission permits. The new, comprehensive signage program was developed in partnership with the Bay Trail Project and includes a suite of signs that are both distinctive and recognizable as Commission-required public access and are integrated with the Bay Trail signage. The suite of signs identify BCDC public access areas and segments of the Bay Trail, provide natural and cultural interpretation of the Bay shoreline, communicate behavioral norms to trail users, and provide directions to visitors. The Commission is currently in phase two of the project, which involves contracting for the fabrication of signs and distribution. The project is funded through the federal CIAP money.
- **Disabled Access.** The 2000 Assessment and Strategy identified disabled access as an issue that the Commission could address more effectively to improve its public access program. As part of the update to the Public Access Design Guidelines, BCDC obtained copies of the United States Access Board Guidelines (USABG) and incorporated the USABG into the Design Guidelines by reference. The USABG is further used by Commission's Bay Design Analyst to ensure that major projects with public access components accommodate all potential users.

- **The Shoreline Landscape Guide.** The Commission's *Bay Shoreline Landscape Guide: Planting Materials and Methods for San Francisco Bay Shoreline Projects* (The Shoreline Landscape Guide) offers recommendations of suitable plants within development projects along the San Francisco Bay shoreline. The 2000 Assessment and Strategy recommended improving the Commission's public access program by updating this document because it lacked a comprehensive set of planting guidelines that address the numerous shoreline settings that are present along the San Francisco Bay. The original guide was created in 1984 with financial assistance from NOAA. Since the plan was created, new information has emerged and important trends have evolved. Given today's current development practices and the great variety of uses that are proposed along the shoreline of the Bay, the information in the current guide is insufficient.

Shoreline landscaping has many benefits. Depending on the situation and location, effective shoreline landscaping can contribute to attractive public access trail experiences, can minimize adverse effects of public access on wildlife through the use of design techniques such as landscape buffers, and can create upland habitat for wildlife. The Commission is revising the Shoreline Landscape Guide to include a revised list of appropriate shoreline plants for various situations, with an emphasis on natives, an up-to-date list of plant sources, and planting principles for the zone between tidal areas and adjacent development. The update commenced in April 2005 and will be completed in December 2005. The Shoreline Landscape Guide update and revisions will most likely be funded using CIAP money. Additional funding will be necessary to complete this program change.

- **Public Outreach.** Although not included among the nine federal enhancement areas, the 2000 Assessment and Strategy identified increasing public outreach and involvement as a fundamental goal of its CZMP and an overarching goal of its 2000 Strategy. On July 20, 2001, the Commission adopted a comprehensive communications strategy and four-year communications work plan based on a detailed analysis of the Commission's public outreach needs by a professional consultant. The commission also retained a consultant to implement the first two years of the adopted work program. Shortly after the communications strategy was approved, the Commission suffered the first of significant budget cutbacks, which prevented the Commission from entering into the needed consulting contract, eliminated the staff positions that would handle public outreach and education, and curtailed virtually all of BCDC's public information activities. In lieu of a comprehensive public outreach program, the Commission has made CZMP changes that incorporate some elements of improved public outreach, two of which were accomplished through its public access program improvements.

Elements of improved public outreach are included in both the public access signage program and the shoreline access website project. While the primary goal of the signage program is to make the signs more noticeable and attractive to the public for easier shoreline access, the public will also take note that the public access was required by the Commission. Also, by redesigning both the Commission's signs and the Bay Trail signs to look more complementary, the Commission's role in completing the Bay Trail is more likely to be recognized. Similarly, the Commission's partnership with ABAG in developing the shoreline access website (discussed below) will increase recognition of the Commission's role in providing public access to the shoreline.

- **Bay Water Trail.** In September 2005, in response to strong regionwide interest in improved kayak access to the Bay, California adopted legislation creating the San Francisco Bay Area Water Trail. The trail is generally envisioned as a network of landing and launch sites that would allow non-motorized small boaters to take

continuous, multiple-day or single-day trips on San Francisco Bay. The legislation directs BCDC to develop Water Trail recommendations on policies, criteria and guidelines for appropriate location, design, operation and maintenance of the Water Trail.

A NOAA Coastal Management Fellow joined the BCDC staff in August 2005 to lead a two-year planning process with the Coastal Conservancy, Bay Trail Project and Bay Access to develop these recommendations. The planning process will respond to a variety of issues associated with a Bay Area Water Trail: (1) ensuring that enough boat launch sites are available for point-to-point trips; (2) facilitating extended stay trips (i.e. parking, transient slips, overnight accommodations, etc.); (3) developing design criteria for launch sites; (4) assessing environmental impacts; (5) assessing safety/security issues; (5) developing approaches to education and outreach; (6) managing conflicting uses; and (7) developing funding strategies. Funding for the Fellow's salary comes from NOAA (80%) and BCDC (20%), and BCDC provides the operating expenses and equipment and overhead costs in in-kind services. Additional funds for facilitation and GIS costs from the planning process will potentially be provided by the Coastal Conservancy.

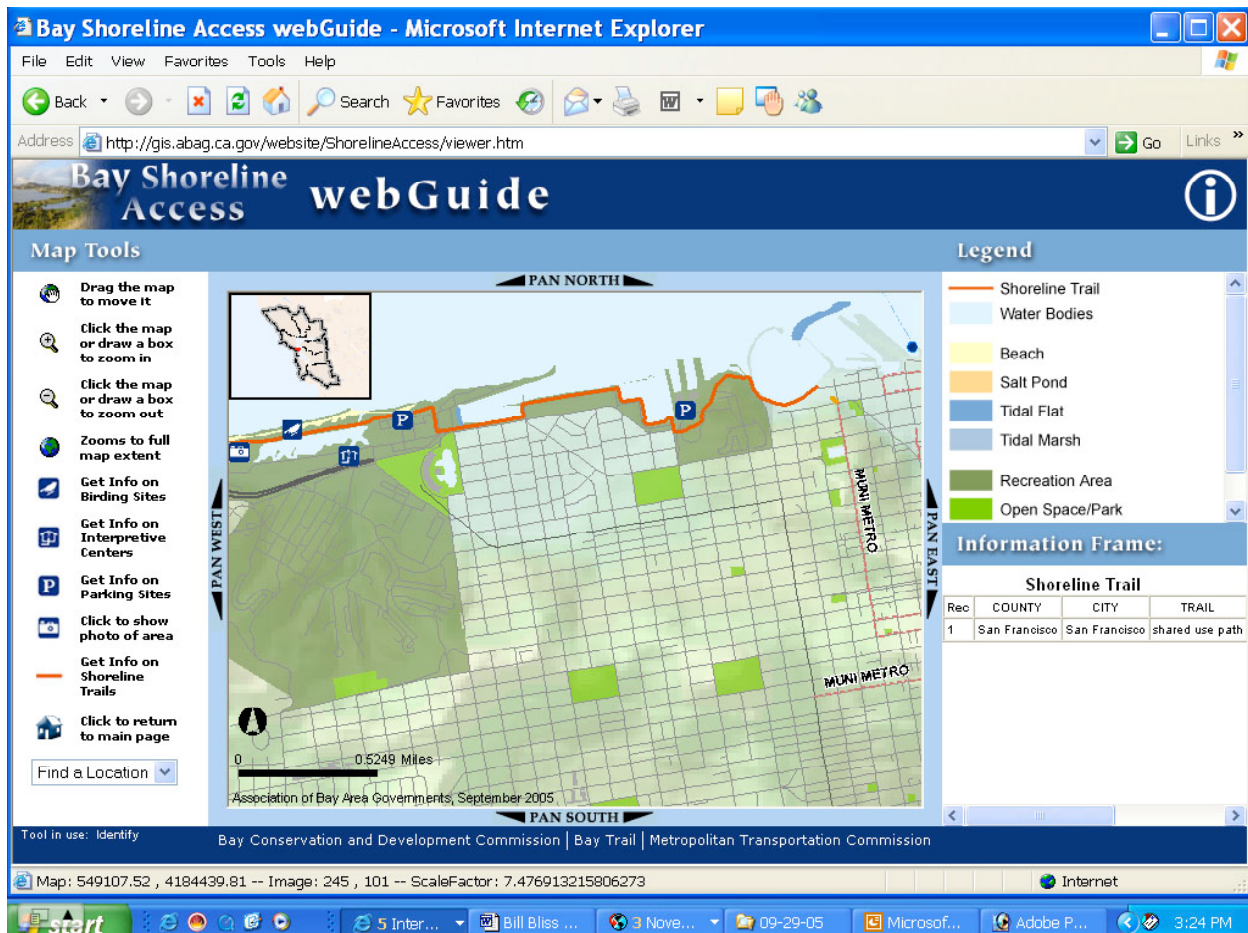
- **Shoreline Access Website.** On October 20, 2005, the staff unveiled the Shoreline Access Website to the Commission prior to launching the site. The website includes an interactive mapping application showing San Francisco Bay shoreline recreational access opportunities for the nine county San Francisco Bay region, thereby providing users the ability to navigate around the Bay to find shoreline recreation opportunities such as bicycling, hiking and bird watching, as well as public access amenities including parks, wildlife refuges and staging areas. The website was developed in coordination with ABAG using data that was developed for BayRAT, the Bay Trail Project, and other sources. The shoreline access web-guide can be accessed at <http://gis.abag.ca.gov/website/ShorelineAccess/index.htm> and has the following features:
 1. The ArcIMS site will deliver accurate, up to date, quality maps to the general public.
 2. Users will be able to download and print 8.5" x 11" size maps.
 3. Provide detailed BCDC shoreline access and Bay Trail route databases, both existing and proposed.
 4. Identify recreational opportunities in and adjacent to the above areas, such as hiking, bicycling, bird watching, boating etc.
 5. Illustrate major base map features such as parks, open space, transit stations, highways and local roads, for the entire nine county bay region, as well as display aerial imagery within a 5 mile buffer around the bay shoreline.
 6. Incorporate advanced search tools that allow users to search by address, zip code or city of interest, or locate key shoreline recreational opportunities.
 7. Identify known site facilities or points of interest such as interpretive centers, picnic areas, staging areas, restrooms, or commercial establishments that support recreational activities adjacent to the BCDC shoreline access, and Bay Trail Route locations.
 8. Incorporate photographs of key BCDC and Bay Trail segments. Allow users to click on a photo icon in the map service that will launch a separate window depicting the image taken from the chosen location. (Images can be a series of slides with multiple views).

9. Incorporate advanced query tools that allow users to identify descriptive information about key features or site locations.
10. Allow users to provide feedback to BCDC and Bay Trail staff members.
11. Be scalable so that additional site features and information may be added in the future as funding is available.

Exhibit 3

Bay Shoreline Access Website Screen Capture

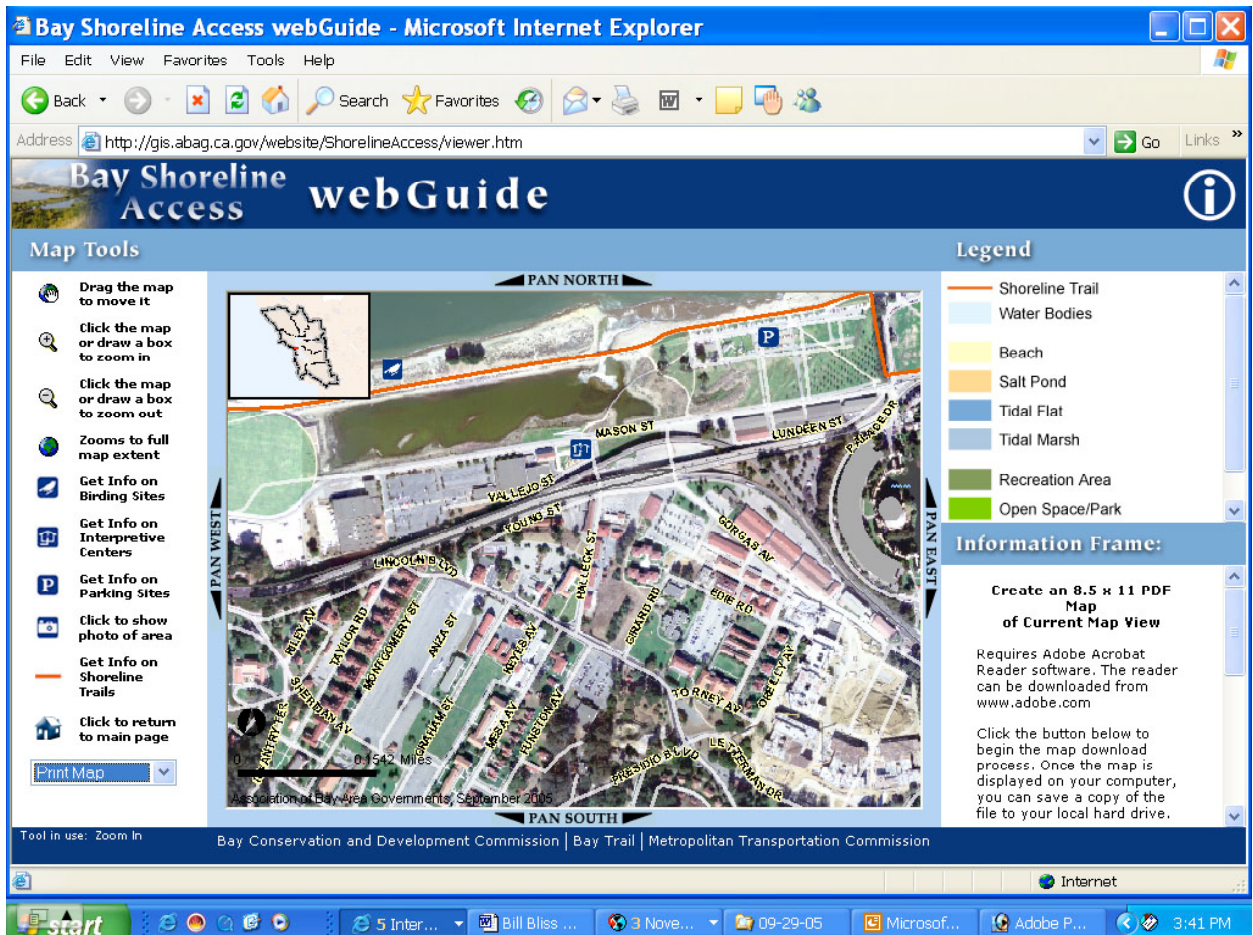
Shows Screen After Initial Query



Should a website user click on the northern shoreline of San Francisco using a map of the Bay, this general map of the vicinity appears. The map shows special features, such as areas for parking, birding, and the Bay Trail and/or BCDC-required public access. The “information frame” in the bottom right corner of the screen can display contact information, pictures of the area, or information about the trail. The magnification tool allows the user to click the map again or draw a box to zoom in closer (Exhibit 4).

Exhibit 4

Bay Shoreline Access Website Screen Capture Shows a Sample Detailed Map



The detailed map uses an aerial photograph and displays street names. The information frame enables the user to easily generate a printer-friendly map from this screen.

The Shoreline Access Website was developed using Coastal Impact Assistance Program funding and is the first and only interactive shoreline access guide for the Bay Area. Even though it provides a comprehensive tool for planning shoreline excursions, it could be improved with additional, important information. *The Bay Shoreline Guide*, published by the California Coastal Conservancy, contains the most complete source of information about the Bay shoreline. By working with the Coastal Conservancy to incorporate the information from *The Bay Shoreline Guide* into the interactive shoreline access website, BCDC, ABAG and the Conservancy could provide the public with a completely comprehensive and easy-to-use tool for planning shoreline excursions.

Table 10. Summary of Changes Since Previous Assessment

Management Category	Changes Since Last Assessment
Regulatory Programs	Significant
Acquisition Programs	None
Comprehensive Access Planning	Significant
Operation & Maintenance Programs	None
Innovative Funding Techniques	None
Public Education and Outreach	Significant

Priority Objective to Improve BCDC's Public Access Program. To further its program to improve public access to the Bay, the Commission should explore ways to increase public access and refine its policies related to public access, through such avenues as:

- **The Shoreline Landscape Guide.** The Commission should improve its public access program by updating Shoreline Landscape Guide to include a comprehensive set of planting guidelines that address the numerous shoreline settings that are present along the San Francisco Bay. The original guide was created in 1984 with financial assistance from OCRM. Since the plan was created, new information has emerged and important trends have evolved. Depending on the situation and location, effective shoreline landscaping can contribute to attractive public access trail experiences, can minimize adverse effects of public access on wildlife through the use of design techniques such as landscape buffers, and can create upland habitat for wildlife. The Commission should update the Shoreline Landscape Guide to include the following: (1) a revised list of appropriate shoreline plants for various situations, with an emphasis on natives; (2) an up-to-date list of plant sources; and (3) planting principles for the zone between tidal areas and adjacent development.

Additional Opportunities to Improve BCDC's Public Access Program. To further its program to improve public access to the Bay, the Commission could explore ways to increase public access and refine its policies related to public access, through such avenues as:

- **Expanding the Shoreline Access Web Site.** The Commission should improve its public access program by continuing to expand and improve the shoreline access web site. The Commission could work with the Coastal Conservancy to incorporate the information from *The Bay Shoreline Guide* into the interactive shoreline access website. Through improvements such as this, BCDC, ABAG and the Conservancy could provide the public with a completely comprehensive and easy-to-use tool for planning shoreline excursions.
- **Public Access Planning for Large-Scale Restoration Projects.** There are several large-scale wetland restoration projects in the planning and implementation stages in San Francisco Bay, totaling over 30,000 acres. These projects have the potential to add significantly to the public access opportunities in the region. Some of these projects lack sufficient funding to enable the sponsors to engage the public and responsible public agencies in a collaborative manner to determine how to maximize public access opportunities as part of these projects. The Commission is ideally suited to assist or lead in the implementation of stakeholder processes to address the public access opportunities and challenges that these significant restorations projects represent.

Special Area Management Planning (*Medium Priority*)

Program objectives address the need to prepare and implement special area management plans for coastal areas with significant coastal resources that are being severely affected by cumulative or secondary impacts and/or where a multiplicity of local, state, and federal authorities require effective coordination and cooperation in addressing coastal issues.

Table 11. Special Area Management Issues

Area	Major Issues
San Francisco Southern Waterfront	Development: potential Bay fill; impacts on public access along waterfront
Suisun Marsh	Outdated duck club management plans are inconsistent with U.S. Fish and Wildlife Service requirements

Background. Special area management planning involves the preparation and implementation of management plans focusing on important coastal areas. These areas may require protection of significant natural resources, coastal-dependent economic growth or improved protection of life and property in hazardous areas. Since its creation, BCDC has utilized special area planning to address a variety of issues and areas meriting special concern. Under BCDC regulations, a special area plan (SAP) applies any or all of the policies in the Bay Plan in greater detail to a specific geographic area lying either wholly or partially within BCDC jurisdiction. The purpose of a SAP is to guide more precisely public agencies and private parties as to what fill, dredging or change of use in a shoreline area would be consistent with the McAteer-Petris Act and Bay Plan policies. Interagency cooperation is a key feature of SAPs, which are adopted by the Commission as amendments to the Bay Plan and by local governments as part of their general plans and zoning ordinances. A number of special area plans have been produced by the Commission to offer management strategies specific to selected areas. This comprehensive approach is an integral part of Commission planning activities and has been successfully incorporated into its coastal management program for San Francisco Bay.

BCDC's Special Area Plans. In keeping with the objectives of the McAteer-Petris Act that encourage BCDC to coordinate its planning with planning by local agencies, the Commission has worked closely with Bay Area local agencies to further BCDC's goals to prevent unnecessary Bay fill, maximize public access where compatible with resource protection, encourage and support appropriate shoreline development, and to encourage management practices that protect significant coastal resources. Through these local government planning partnerships, the Commission has developed a number of plans for specific areas around the Bay.

To aid in planning for future uses on San Francisco's northern waterfront, in 1975 a committee representative of many interests developed the San Francisco Waterfront Special Area Plan. Like other SAPs developed by BCDC, the plan is intended to serve as a guide as to what fill, dredging or changes in use are consistent with the McAteer-Petris Act and policies of the Bay Plan. The Special Area Plan called for the preparation of more specific policies for the segment of the waterfront between piers 9-24. The San Francisco Waterfront Total Design Plan was adopted in 1980 and discussed more precisely potential replacement fill and appropriate uses on the designated piers. Following a four-year planning process that involved the San Francisco Port Commission, Save San Francisco Bay Association, citizen groups and BCDC, in July 2000 the Commission amended the Special Area Plan and the Bay Plan. Subsequently, the Port Commission modified its Waterfront Land Use Plan in a manner consistent with the changes to the Special Area Plan that were adopted by the Commission. The Total Design Plan was rescinded, and its relevant policies incorporated in the revised Special Area Plan.

To address increased demand for recreational uses and problems associated with poorly controlled houseboat uses in an area of the Bay located in southern Marin County, an agreement was reached among the various agencies involved to jointly prepare a special area plan for Richardson Bay. The Richardson Bay Special Area Plan created a unified set of policies and regulatory controls that establishes a shared jurisdiction between the Commission and five local governments (one county and four cities) over this important recreational water body.

The Benicia Special Area Plan was adopted by the City of Benicia as part of its comprehensive plan and as an amendment to the Bay Plan in 1977, and thus guides BCDC and Benicia in planning and permitting in the waterfront area. Adopted the same year as the Benicia SAP, the Richmond South Richmond Shoreline Special Area Plan applies to a particular segment of the City of Richmond's shoreline, and helps guide new shoreline development and Bay protection in this area.

In 1996, the Commission conditionally approved the White Slough Specific Area Plan prepared and adopted by the City of Vallejo and Solano County. Although not a special area plan under the Commission's rules, the White Slough Plan was prepared pursuant to state legislation, the White Slough Protection and Development Act. Under the Act, after the conditional approval of the plan by the Commission, Vallejo and the County were required to amend their general plans and zoning ordinances to conform to the White Slough Plan. The Commission granted final approval of the plan in December 1999; consequently, BCDC will issue or deny permits for the placing of fill, extraction of materials, or the substantial change in use of any area within White Slough based on the project's consistency with the White Slough Specific Area Plan.

Local Protection Programs in the Suisun Marsh. The Suisun Marsh Plan represents an early special resource management plan adopted by the Commission, and includes unique implementation measures involving intergovernmental coordination to protect the 89,000 acres of tidal marsh, wetlands, adjacent grasslands and waterways of the Suisun Marsh and 22,500 acres of surrounding upland agricultural land. The Suisun Marsh Preservation Act (the Marsh Act) authorizes the Commission to certify local protection programs for areas with significant coastal resources and overlapping government jurisdictions. Pursuant to Sections 29000-29612 of the Marsh Act, one such program is "a management program prepared by the Suisun Resource Conservation District [SRCD] designed to preserve, protect and enhance the plant and wildlife communities within the primary management area of the [Suisun] marsh including but not limited to enforceable standards for diking, flooding, draining, filling, and dredging of sloughs, managed wetlands and marshes." A component of the SRCD's management program is the individual club management plans for the 158 private duck clubs and several public hunting areas in the primary management area of the marsh.

BCDC's Regional Plans. The Commission participates in regionwide planning efforts for the Bay Area in addition to the Bay Plan. The Seaport Plan, a result of a cooperative effort between the Metropolitan Transportation Commission (MTC) and BCDC, guides both agencies in their decision making regarding seaport development and related proposals for transportation and land use development. The Seaport Plan is a component of the Bay Plan, where it is the basis for the Commission's policies for port development. The Regional Airport System Planning Analysis (RASPA), most recently updated in September 2000 by the Regional Airport Planning Committee (co-sponsored by the Association of Bay Area Governments, MTC and BCDC), serves a similar function for the Bay Area's system of airports and aviation-related facilities as the Seaport Plan does for port facilities. These planning efforts are discussed in the Energy and Government Facility section.

Conclusions of Previous Assessment. In the 2000 Assessment and Strategy, the Commission made plans to build on its proven success in joining with local jurisdictions and others to foster greater coordination in developing policies and land use planning for the Bay and shoreline through by developing special area plans on the San Francisco waterfront and the Oakland waterfront as well as by participating in the identification of National Marine Protected Areas. In the previous Assessment, the Commission ranked its special area planning program as a high priority enhancement area. The major enhancement objective in this program was the successful update to the San Francisco Waterfront Special Area Plan. While it is likely that BCDC's special area plans may require updating in the future, there are currently higher priorities and limited staff available for enhancing BCDC's coastal management program. Therefore, the special area planning program was changed from a high priority to a medium priority.

Changes in BCDC's Special Area Planning Program Since Previous Assessment

San Francisco Waterfront Planning. The *San Francisco Waterfront Special Area Plan* completed with the Port of San Francisco in 2000 did not include the remainder of the very important Fishermans Wharf and southern waterfront areas. The special area planning process was started at Fishermans Wharf and delayed with no future date scheduled to resume the planning project. However, due to continued and accelerated growth and development along the Southern Waterfront, there is still a need for updated and specific policies pertaining to this area of the shoreline.

In July 2000, the San Francisco Port Commission adopted changes to its Waterfront Land Use Plan and Design and Access Element that were consistent with the changes to the Bay Plan and the Special Area Plan that were adopted by the Commission. The amended San Francisco Waterfront Special Area Plan includes provisions for substantial public benefits as well as specific requirements for public access and implementation of public benefits. At the same time, the changes to the Bay Plan allow for a broader range of uses on redeveloped piers that will create a vibrant and inviting waterfront setting, that, in conjunction with substantial open spaces provided for in the plan, will meet the evolving public trust needs of Bay Area residents, visitors, and all Californians.

Since the 2000 amendments to the *San Francisco Waterfront Special Area Plan* and the Bay Plan, BCDC and the Port Commission have approved several major projects along the waterfront, including a new cruise ship terminal with substantial public access and other public benefits. The Design Review Boards that advise both Commissions have instigated joint, simultaneous project review to minimize potential conflicts between each Commissions' respective design goals. In addition to avoiding potential conflicts, the joint design review created a forum for discussion that results in better public access design.

With the success of the 2000 amendments to the *San Francisco Waterfront Special Area Plan* the Port requested that the Commission continue this work to address future development along much of the remainder of the waterfront. Specifically, the Port and the Commission need to plan for potential development impacts that will affect the southern waterfront. The area south of China Basin features the City's remaining cargo shipping facilities. As proposals for non-maritime, mixed use development increase along the southern waterfront, so do real estate values and this threatens some of the only legitimate port uses remaining within the Port of San Francisco.

Oakland Waterfront Planning. The Commission believed that it would be valuable to build on a joint planning effort begun in 1996-98 with the City and the Port of Oakland. Commission staff began efforts to capture the unique opportunity to develop policies and access guidelines for Oakland's urban industrial waterfront in accordance with BCDC policies. However, the interest was not reciprocated by the local governments and the Commission and local governments agreed to terminate the project.

Marine Protected Areas. In response to Executive Order 13158 issued by ex-President Clinton in 2000 to identify Marine Protected Areas (MPAs), BCDC worked with NOAA's Office of Ocean and Coastal Resource Management, under the authority of the Coastal Zone Management Act, to identify MPA candidates in San Francisco Bay. As the MPA program was targeted at ocean habitats rather than estuarine habitats, MPAs have not been designated in San Francisco Bay to date. The Subtidal Habitat Goals Project discussed in the "Wetlands" section will seek to identify restoration priorities for important subtidal, estuarine habitats in the "Bay."

Suisun Marsh Local Protection Programs. The SRCD prepared the individual duck club plans with financial assistance from the Office of Coastal Resource Management in the late 1970's and early 1980's. These plans were certified by the Commission. They serve as the basis for determining whether proposed club management activities are consistent with the approved management plan and thus approvable at the local level, or involve activities not authorized in the approved plan and, therefore, require a Commission permit. There are growing concerns about declining populations of fish and wildlife species in the marsh. As the agency with primary responsibility for the protection of declining species, the United States Fish and Wildlife Service now requires club management practices that are not covered in or are inconsistent with the 158 duck club management plans approved in the 1970's and 1980's. The SRCD and the Commission want to update the plans to reflect current club management practices in the marsh, and to create a comprehensive GIS data base that describes all water control structures and other improvements on the clubs to improve communications between the clubs and the SRCD and between the SRCD and the Commission. The Commission will ensure that the new plans include current best management practices, and will conserve plant, fish and wildlife species in the marsh, consistent with the requirements of the Suisun Marsh Preservation Act, and the Suisun Marsh Plan.

Opportunities to Improve BCDC's Special Area Planning Program. The Commission can build on its proven success in joining with local jurisdictions and others to foster greater coordination in developing policies and land use planning for the Bay and shoreline through such special area planning programs as:

- **San Francisco Southern Waterfront.** BCDC and the Port of San Francisco need to plan for potential development impacts that will affect the southern waterfront. The 2000 amendments to the San Francisco Waterfront Special Area Plan provide an excellent example of a successful collaborative planning process between the Port and BCDC that has reduced conflicts and improved project review and policy implementation. BCDC and the Port should continue their partnership by updating the policies pertaining to the area south of China Basin, which features the City's remaining cargo shipping facilities, and is currently facing proposals for non-maritime mixed use development.
- **Suisun Marsh Planning.** The SRCD and the Commission want to update the plans to reflect current duck club management practices in the marsh, and to create a comprehensive GIS data base that describes all water control structures and other improvements on the clubs to improve communications between the clubs and the SRCD and between the SRCD and the Commission. The Commission will ensure that the new plans include current best management practices, and will conserve plant, fish and wildlife species in the marsh, consistent with the requirements of the Suisun Marsh Preservation Act, and the *Suisun Marsh Preservation Plan*.

Marine Debris (Low Priority)

Program objectives address the need for reducing marine debris entering the nation's coastal and ocean environment by managing uses and activities that contribute to the entry of such debris.

Background. Debris in the Bay can threaten environmental resources, endanger marine life, and pose risks to public health and safety. It can also interfere with public trust uses of the Bay, such as navigation, fishing, and recreation. Bay debris originates from a variety of sources including recreational users of the Bay and shoreline, urban storm drains, and municipal waste water treatment plants. Water quality varies significantly within the Bay due to the pattern of waste discharges and the varying capability of the Bay to disperse and flush these discharges.

Plastics are considered to be the most harmful debris to the marine environment and to marine life and are the most common type of debris found in the Bay. The light weight of plastic items threaten marine mammals and birds with entanglement or ingestion. Even when plastic debris break into smaller pieces in the water, particles remain a danger to the marine environment for decades.

Hazards to navigation are presented by logs, pilings and other forms of large debris floating in the Bay. Deteriorating pile-supported structures are found along some areas of the shoreline. San Francisco's waterfront, in particular, features a number of deteriorating piers, elements of which can break free to create hazards to large and small vessels.

Storm water runoff is directed into the Bay through a network of open channels, drain pipes and street gutters. Catch basins are designed to limit the amount of debris entering the storm drains; however, many are not designed to stop smaller solid waste products.

BCDC's Marine Debris Program. Because of the regulatory authority of the State and Regional Water Boards, the EPA, and the Army Corps of Engineers, the Bay Plan does not deal extensively with the problems and means of waste control. However, the entire Bay Plan is founded on the belief that water quality in the Bay should be maintained at levels sufficiently high to protect the beneficial uses of the Bay. The McAteer-Petris Act (Section 66646.1) states that the policies, decisions, advice and authority of the State Water Resources Control Board and the San Francisco Bay Regional Water Quality Control Board should form the basis for the Commission in carrying out its water quality responsibilities for San Francisco Bay. Section 66632(e) of the Act further requires that copies of project applications filed with BCDC be submitted to the Regional Water Board, which in turn files a report on the project's potential adverse effects to Bay water quality. By including in permits that it issues specific water quality conditions that help to implement the standards of the Regional Board, the Commission can work with the Board to protect the public and the beneficial uses of the Bay.

Conclusions of Previous Assessment. In the 2000 Assessment, the Commission ranked its marine debris program as a lower priority enhancement area, primarily due to BCDC's lack of jurisdiction over marine debris. This program remains a lower priority.

Changes in BCDC's Marine Debris Program Since Previous Assessment

Table 12. Marine Debris Issues

Source	Impact	Type of Impact
Abandoned and sunken vessels	Significant	Navigational hazards; water quality impacts; public trust uses
Non-permitted anchor outs, houseboats	Significant	Navigational hazards; water quality impacts; public trust uses

- **Alviso Slough.** An interagency task force was established in 1995 to clear the mouth of Redwood Creek in San Mateo County of abandoned and sunken vessels, resulted in the successful removal of 80 vessels. Following the success of the "Operation Aqua Terra" joint enforcement effort, representatives from federal, state and local agencies and elected officials formed the "Alviso Slough Cleanup Group" to address a similar situation in Alviso Slough in the South Bay. This effort resulted in the removal of 30 abandoned and sunken vessels and six out of a total of nine illegal live-aboard vessels. Funding for these activities was obtained from the state Bay Fill Clean-up and Abatement Fund. To force the removal of the remaining three live-aboard vessels, BCDC acted independently from the task force and issued three cease and desist and civil penalty orders in 1997. Compliance with one of these orders has been achieved and the other two were referred to the California Attorney General's Office. The Attorney General obtained final judgments that ordered removal of the unauthorized live-aboard boats and the payment of appropriate penalties. Only one party has not complied with the court order and the staff is now enforcing the order. Additional boats and debris have appeared in the Slough and the staff has created a multi-agency effort to tackle the new problems.
- **Richardson Bay.** Since the Commission obtained "bay" jurisdiction in 1965, the Commission has had significant enforcement concerns in Richardson Bay due to a sizable and growing houseboat and anchor-out community and extensive marinas along the Sausalito shoreline. In 1984, the Richardson Bay Special Area Plan (RBSAP) was adopted jointly by the Commission, Marin County, and the Cities of Sausalito, Tiburon, Belvedere and Mill Valley. The RBSAP contains the findings and policies that guide the Commission, the cities and the county in authorizing uses and development in Richardson Bay. In 1985, the Richardson Bay Regional Agency (RBRA) was created by a joint powers agreement among the cities and County. The agreement provides that the RBRA's governing body shall maintain and implement the provisions of the RBSAP including the regulation of mooring, dredging and navigational channels; the coordination of public services and facilities such as police and fire protection, sewage pump-out facilities and public docks or moorings; and the undertaking of enforcement actions.

In 1995, the RBRA hired a full time Harbor Administrator and undertook an ambitious plan to systematically remove navigational hazards, derelict structures and anchor-outs from Richardson Bay. From 2001 to 2006, the RBRA removed 222 vessels including four houseboats. A large percentage of the removed vessels had been used as residences on Richardson Bay at one time or another, and at least 47 of those were anchor-out vessels at the time they were removed. Cost to remove these vessels was \$385,000.00 through funding secured through the California State Boating and Waterways Abandoned Watercraft Abatement Fund, with a additional funding through BCDC mitigation programs and \$40,000.00 from the State Coastal Conservancy. Approximately 86 of the vessels removed posed a severe navigational threat as sunken vessels, and many others were removed from beaches and disposed of.

The Commission works closely with the RBRA to track the arrival and removal of non-authorized vessels and provide enforcement support and assistance. Since 2001, an additional thirty or 40 vessels have visited but moved on from Richardson Bay as a result of the RBRA and BCDC's efforts to track vessels and discourage them from attempting to secure a permanent anchorage. Commencing in 1998, the staff assigned a liaison, who attends many of the regular RBRA meetings. This contact has increased the staff's understanding of the physical and legal impediments to removing non-authorized vessels, and the staff believes it has been able to inform the RBRA about the

Commission's concerns with illegal vessels. Further, the staff has assisted the RBRA on projects such as developing a recent legislative proposal to streamline the process to remove abandoned vessels.

Although the efforts of the RBRA have reduced the number of vessels that are abandoned or that "anchor out" in Richardson Bay, abandoned, derelict vessels continue to appear and the RBRA continues to remove them, provided it has adequate funding. The Commission has provided funds available through a \$750,000 account established by Caltrans to be used as mitigation for the fill needed for the seismic retrofit of the Richmond-San Rafael Bridge for use by the RBRA in removing sunken and derelict vessels. An additional \$75,000 was provided to the RBRA for this purpose through mitigation conditions contained in two recent BCDC permits. The RBRA and the Commission will continue their individual and joint efforts to remove these navigational hazards from the Bay.

- **Waldo Point Harbor Houseboat Marina.** In 2003, the Commission issued a twenty-year permit that reauthorized the Waldo Point Harbor houseboat marina and approved additions to the marina, north of Sausalito, in the Richardson Bay, in an unincorporated area of Marin County. The additions include after-the-fact approval to moor 30 formerly unauthorized and dilapidated vessels on a new 360-foot-long floating dock. The project includes modern plumbing and sewage hook-ups to satisfy Marin County building codes as well as vessel upgrades to eliminate rotting hulls, leaks and other problems, thereby eliminating water quality hazards.
- **Legislative Efforts to Reduce Marine Debris.** Through the Spring and Fall of 2004, the staff participated on the Department of Boating and Waterway's Abandoned Vessel Task Force in order to develop recommendations to the Legislature as to how to improve the State's response to abandoned recreational boats in the Bay and Delta. These recommendations were signed into law and are now helping to prevent their abandonment and enable easier removal. The law is proving useful in the Richardson Bay as well as in Alviso Slough.

California State Assembly Bill No. 1940 was introduced in February 2006, to create a statewide task force to address the issue of marine debris. The Bill recognizes that marine debris is harmful to marine resources, particularly sensitive species that ingest or become entangled in floating debris. If signed into law, the Bill would create a comprehensive response to the harmful effects of marine debris among the following state agencies: Coastal Commission, Department of Conservation, Water Resources Control Board, Integrated Waste Management Board, Department of Boating and Waterways, Coastal Conservancy, and BCDC.

- **Coastal Cleanup Day.** As part of its Coastal Zone Management Program, the California Coastal Commission sponsors a statewide beach clean-up day and collects the data for the ocean coastline and the Bay shoreline as part of its beach clean-up program. The data is broken down by county and some counties include both ocean coastline and Bay shoreline. Coastal Cleanup Day is the highlight of the California Coastal Commission's year 'round Adopt-A-Beach program and takes place every year on the third Saturday of September, from 9 a.m. to Noon. Coming at the end of the summer beach season and right near the start of the school year, Coastal Cleanup Day is a way for families, students, service groups, and neighbors to join together, take care of the marine environment.

Table 13. Coastal Cleanup Day 2005 Totals for Bay Area Counties

County	Trash	Recyclables	All Debris
Alameda	34,941	4,779	39,720
Contra Costa	42,615	5,609	48,224
Marin	6,223	3,673	9,896
Napa	4,095	904	4,999
San Francisco	5,543	2,716	8,259
San Mateo	12,687	1,946	14,633
Santa Clara	17,558	3,062	20,620
Sonoma	1,269	387	1,656
Total	124,931	23,076	148,007

Opportunities for Improvement. BCDC has demonstrated that it has an important role in addressing issues related to marine debris, particularly that in the form of Bay fill. Through partnerships with other interested agencies, the Commission can assist local governments address major clean-up and removal efforts. Through its Enforcement Committee and Compliance Assistance Task Force, BCDC has contacted local governments and the public to inform them of BCDC's program, thereby advancing efforts to reduce the amount of debris entering the Bay.

Ocean Resources (*Low Priority*)

Program objectives address the need for planning for the use of ocean resources.

The jurisdiction established by the McAteer-Petris Act for the Commission delimits its westernmost boundary as the line from Point Bonita in Marin County to Point Lobos in San Francisco. This is a shared boundary with the California Coastal Commission, the state agency charged with administering the coastal management program for the Pacific Ocean segment of the coastal zone. Thus, as BCDC's management program operates under the Act, ocean waters do not fall within the Commission's authority, but under that exercised by the California Coastal Commission. Due to these jurisdictional issues, BCDC's ranking of this program has not changed since the previous Assessment.

Please refer to the Wetlands and Cumulative and Secondary Impacts sections, respectively, for related discussion on habitat and dredged material management planning for San Francisco Bay.

Aquaculture (*Low Priority*)

Program objectives address the need for considering siting of marine aquaculture facilities while maintaining current levels of coastal resource protection.

Primarily as a result of lingering water quality issues, it is not anticipated that an aquaculture program for San Francisco Bay will be developed in the near future. Past experience with oyster farming in the Bay proved not to be cost effective, when oysters had to be relocated out of San Francisco Bay to Tomales Bay to flush toxins deposited in the oysters before being marketed. Studies continue to show high levels of toxins in the Bay, and warnings have been issued by the Regional Water Board and local departments of public health as to potential adverse effects caused by eating fish caught in the Bay. Due to these contamination issues, BCDC's ranking of this program has not changed since the previous Assessment.

Program Enhancement Strategy

Program Change #1: Wetlands Program Improvements

The Commission should expand protection of the Bay's wetlands and foster wetland restoration programs through such programs improvements as refining its Bay Plan policies pertaining to subtidal habitats and managed wetlands.

- **Subtidal Habitats and Mineral Resources.** As part of its effort to develop and implement a comprehensive program for the sustainable use, restoration and conservation of the Bay's subtidal resources, the Commission should update the Bay Plan findings, policies and map designations pertaining to subtidal areas, including sand and shell extraction, sediment movement in the Bay, and function and value of subtidal habitats. Modeled on the highly successful Baylands Ecosystems Habitat Goals Project, the appropriate policy revisions would emerge from a comprehensive, cooperative, interagency, science-based Subtidal Habitat Goals Project.

Bay Area decision-makers are increasingly asked to make decisions that affect subtidal habitats, which requires critical, missing information and policy guidance regarding the subtidal environment, such as the following: (1) the relative importance of subtidal habitats (e.g., do we need more shallow water versus deep water habitats?); (2) appropriate restoration techniques (should shallow water habitats be restored with dredged materials or by returning areas diked from the Bay to tidal action?); (3) the appropriateness of large-scale fill for subtidal habitat improvement and the affect on hydrodynamics, bathymetry, and substrata; (4) a full understanding of the threats to these habitats; and (5) the dynamics between water quality or freshwater inflow and subtidal habitats.

Identified as a high priority project in BCDC's program assessment to address impacts.

Project Objectives. The objectives of the Subtidal Habitat Goals Project include the following: (1) characterize the subtidal habitats and understand their historical and current function and value within San Francisco Bay; (2) develop subtidal habitat goals for management, protection, restoration and enhancement; (3) identify and recommend additional research needs for San Francisco Bay; (4) identify and recommend restoration and protection priorities for subtidal habitats; and for BCDC in particular; (5) revise applicable findings and policies in the Bay Plan.

- a. *November–December 2005.* Develop detailed work plan with staff of lead state and federal agencies that serve as the administrative core group for the Subtidal Habitat Goals Project.
- b. *January 2006–April 2007.* Synthesize information and data, hold working group and stakeholder meetings, specifically on science, management and restoration, develop general consensus on recommendations for management, conservation and restoration of subtidal habitats in San Francisco Bay.
- c. *May–September 2007.* Prepare draft Subtidal Habitat Goals Report for review.
- d. *October 2007–March 2008.* Prepare and distribute final Subtidal Habitat Goals Report.
- e. *April–December 2008.* Draft proposed revisions to the Bay Plan based on information and recommendations in the Subtidal Habitat Goals Report.
- f. *January–September 2009.* Hold a public hearing(s) on the proposed revisions. Prepare final staff recommendation and hold a Commission hearing to vote on the proposed Bay and Suisun Marsh Plan amendments.

Summary of Estimated Costs

Staff time (2.0 personnel years).....	\$341,220
Travel.....	\$4,000
Consultant assistance (cartographer).....	\$5,000
Total project cost.....	\$350,220

Likelihood of Achieving the Program Change. BCDC has already entered into a partnership with NOAA Fisheries, NOAA's National Ocean Service, U.S. Environmental Protection Agency, the California Coastal Conservancy, and the San Francisco Estuary Project to serve together as the administrative core group for the Subtidal Habitat Goals Project. The Subtidal Habitat Goals Project has received a grant for \$19,000 from the San Francisco Estuary Project and is likely to receive more funding (approximately \$50,000) from the Ocean Protection Council in early 2006. The Commission has identified promotion of further research and analysis on the role of sediment in the Bay and the update of findings and policies on extraction of resources from the Bay as high priorities, both of which will be addressed as part of the overarching Subtidal Habitat Goals Project. Therefore, BCDC is committed to accomplishing the project.

- **Managed Wetlands Policies.** As part of its effort to develop and implement a comprehensive program for the use and restoration of Bay resources, the Commission should update the Bay Plan and the Suisun Marsh Plan findings, policies and map designations pertaining to managed wetlands. The managed wetlands findings, policies and map designations need to be updated to incorporate new information regarding: (1) managed wetland habitat values; (2) the location of managed wetlands; (3) land managed approaches undertaken by private duck clubs responsible for maintaining some managed wetlands; (4) restoration or management objectives proposed by public agencies responsible for maintaining other managed wetlands; and (5) possible conversion of some managed wetlands to tidal and subtidal habitat.

Identified as a high priority project in BCDC's program assessment to address impacts.

General Work Plan

- October—December 2005.* Information and data collection.
- January—February 2006.* Synthesize information and data and develop a list of the major policy issues regarding the continued operation and possible alternative scenarios for the managed wetlands.
- February—April 2006.* Prepare draft staff report.
- May—October 2006.* Draft proposed changes to the Bay Plan and Suisun Marsh Plan findings, policies and maps. Undertake scientific, stakeholder and staff review of the draft background report with proposed Bay and Suisun Marsh Plan revisions.
- November—December 2006.* Finalize staff background report and prepare proposed staff recommendation for amendments to the Bay Plan and Suisun Marsh Plan.
- January—June 2007.* Hold a public hearing(s) on the proposed staff recommendation. Prepare final staff recommendation and hold a Commission hearing to vote on the proposed Bay and Suisun Marsh Plan amendments.

Summary of Estimated Costs

Staff time (0.6 personnel year)	\$91,400
Travel.....	\$4,000
Printing.....	\$2,500
Consultant assistance (cartographer).....	\$5,000
Total project cost.....	\$127,993

Likelihood of Achieving the Program Change. There is a high likelihood of completing and implementing this proposed change. BCDC has received a United States Environmental Protection Agency Wetlands Program Development Grant for \$90,645 to complete this program change. In addition, the amendment to the Bay Plan findings, policies and map designations pertaining to managed wetlands is the only update related to wetlands that remains to be completed in the suite of Bay Plan wetland policies (tidal marshes and tidal flats, subtidal areas, salt ponds and managed wetlands), as defined in the Commission's coastal management program Improvement Strategy and the Commission's Work Program. Completion of the revision of the managed wetlands section of the Bay Plan will complete the critical update of all the Bay Plan wetlands policies and will also update the Suisun Marsh Plan. Therefore, BCDC is committed to accomplishing the project.

- **Science Integration.** Permit evaluations for projects in the Bay increasingly require coordination between the staff and the scientific community to assess the potential impacts of projects and minimize harmful affects to Bay wetland resources as required in the McAteer-Petris Act. There is a need to evaluate ways to expand communication with scientists and incorporate scientific review into all Commission processes, especially within the tight permitting timelines. Therefore, the objective of this project is to improve scientific review of project proposals during the permit process by developing more expansive and consistent communication with scientists. This could involve any of the following methods of implementation: create a science advisory panel similar to the Commission's Design Review Board or Engineering Criteria Review Board; set up science seminars for BCDC staff; expand BCDC's role in the Wetlands Design Review Group (WDRG); and evaluate whether policies are needed to support the use of scientific review in permit processing and, if needed, develop new Bay Plan policies.

Identified as a high priority project in BCDC's program assessment to address impacts.

General Work Plan

- October—December 2006.* Evaluate the means through which science is incorporated and integrated into permit processing and develop a detailed work program for identifying and implementing a mechanisms(s) for consistent integration of scientific information in the process.
- January—June 2007.* Select a mechanism(s) to improve communication with scientists and achieve more thorough scientific review during permit analysis and develop a plan to implement the mechanism(s).

Summary of Estimated Costs

Total project cost for staff time (0.5 personnel year)\$85,305

Likelihood of Achieving the Program Change. This objective is one of the Commission's highest priorities to improve its effectiveness and thus, there is a high likelihood of completing and implementing this objective. The nature and extant of the mechanism(s) for improving scientific integration that are identified prior to developing a detailed work plan will determine whether this objective will constitute a program change as defined by the Office of Coastal Resource Management.

Total Cost. The projected costs over the five-year grant period to undertake priority program change #1 would total \$503,769 (\$59,749 spent on work completed on the managed wetlands project in FY 05-06).

Program Change #2: Coastal Hazard Program

The Commission should improve its coastal management program by working cooperatively with local governments to ensure that development in shoreline areas incorporates current safety standards through such avenues as:

- **Global Climate Change.** Temperatures are rising and are predicted to continue to rise for the foreseeable future as a result of human-induced global climate change. The reality of global climate change could be disastrous for the State of California and the San Francisco Bay Area. As temperatures increase, the state will possibly experience changes in precipitation and earlier snowmelt in the Sierra Nevada Mountains. Coupled with projected population increase and growth in the California Central Valley, temperature increases can significantly alter the already strained supply of water for agricultural and municipal uses throughout the state. Changes in California's water supply would ultimately alter the volume of fresh water inflow to the Bay, thereby impacting the Suisun Marsh, water circulation throughout the Bay, species composition, sedimentation rates and distribution, and marsh restoration activities. In addition to issues surrounding water supply, Bay Area residents and Bay natural and economic resources must be protected from the impacts of accelerated, relative sea level rise in the Bay. Historical records show that sea level in San Francisco Bay has risen nearly 18 cm (7 inches) over the past 150 years. However, in the next 100 years, sea level is predicted to rise up to three feet in the Bay.

As part of its effort to improve its coastal hazards program by working cooperatively with stakeholders to address the impacts of human-induced climate change on Bay resources and shoreline development, the Commission should update the Bay Plan findings and policies pertaining to sea level rise and other adverse impacts of climate change. This would be accomplished in a three-phased project, through which the Commission would do the following: (1) conduct extensive research on human-induced climate change and coordinate with other planning bodies and scientists to identify the major impacts on the Bay and associated issues; (2) inform local governments, stakeholders, and the public in the Bay Area regarding the potential impacts of and approaches to planning for human-induced climate change and develop a regional planning approach for addressing the impacts of climate change on Bay resources; and (3) update the policies in the Bay Plan to account for new information about the far reaching impacts of human-induced climate change on the Bay, including, but not limited to, accelerated, relative sea level rise.

Identified as a high priority project in BCDC's program assessment to address impacts.

Project Objectives. The objectives of the global climate change project include the following: (1) identify all of the potential impacts of climate change on the Bay with a focus on documenting the links between impacts on the Sierra Nevada watershed, the state's water supply, and Bay natural and economic resources (2) develop a mechanism to inform regional and state stakeholders of these potential impacts; (3) conduct a public outreach and awareness effort and create a forum through which these impacts can be addressed; and (4) revise applicable findings and policies in the Bay Plan.

General Work Plan

- a. *January—June 2006.* Develop a detailed work plan for researching the impacts of global climate change on the Bay and sharing this information with relevant institutions and organizations.
- b. *July 2006—June 2007.* Conduct research and identify the major issues and impacts on the Bay associated with global climate change.

- c. *July 2007—March 2008.* Develop an effective public awareness and outreach strategy for informing stakeholders of the potential impacts of and create a forum for developing approaches to address global climate change.
- d. *April 2008—June 2009.* Update applicable findings and policies in the Bay Plan.

Summary of Estimated Costs

Staff time (2.5 personnel years).....	\$426,525
Consultant assistance (cartographer and graphic design).....	\$5,000
Travel.....	\$4,000
Printing.....	\$2,500
Total project cost.....	\$438,025

Likelihood of Achieving the Program Change. Addressing the impacts of global climate change is one of the state's highest priorities as well as one of the Commission's highest priorities. In 2004, California Governor Schwarzenegger issued a state directive to identify measures to reduce known emissions that contribute to global climate change and identify the potential impacts of global climate change. Because there is support at the highest level of state government, it is most likely that the Commission will complete and implement this proposed program change.

- **Disaster Preparedness.** As part of its effort to improve its coastal hazards program by working cooperatively with government agencies to address the impacts of disasters on Bay resources and shoreline development, the Commission should update the Bay Plan findings and policies pertaining to shoreline protection and safety of fills. Multiple agencies are involved in planning and preparing for disasters in the state as well as the region. There is a great need to identify the major issues BCDC could confront following a disaster and how BCDC can best work with other agencies to prepare for disasters. It is essential to coordinate with the agencies involved in disaster planning in order to protect Bay natural and economic resources to the maximum extent feasible during and after a disaster. This coordinated effort would lead to better disaster planning, updates to the policies in the Bay Plan pertaining to safety of fills and shoreline protection, and new policies on disaster preparedness where appropriate, such as the Bay Plan sections on airports, sea ports, and water-related industry.

Identified as a high priority project in BCDC's program assessment to address impacts.

Project Objectives. The objectives of the disaster preparedness project are to act proactively to improve the Commission's ability to act in the face of a disaster by doing the following: (1) identify major issues and develop a strategy for working with other agencies in the event of a disaster; and (2) revise applicable findings and policies in the Bay Plan.

General Work Plan

- a. *October—December 2009.* Develop a detailed work plan for evaluating the impacts of a disaster in the Bay and on the shoreline.
- b. *January—June 2010.* Research and identify the major issues BCDC would likely confront following a disaster and how BCDC can best work with other agencies to prepare for such a disaster.
- c. *July—March 2011.* Revise and update the Commission's program, including applicable Bay Plan findings and policies, to better protect Bay natural and economic resources and support coordinated response in the event of a disaster.

Summary of Estimated Costs

Staff time (2.5 personnel years).....	\$426,525
Consultant assistance (cartographer, graphic design, printing).....	\$2,000
Travel.....	<u>\$2,000</u>
Total project cost.....	\$430,525

Likelihood of Achieving the Program Change. The aftermath of three major world events—the events of 9/11, the tsunami in Southeast Asia, and Hurricane Katrina—have either highlighted some of the existing threats in the Bay Area from coastal hazards and/or created new challenges and raised new issues in protecting Bay resources. In light of the Bay Area’s apparent vulnerability from natural and human-induced disasters, there is broad support for this program change and it is one of the Commission’s highest priorities. Furthermore, it is one of the Governor’s priorities and, as such is strongly supported by the State Resources Agency. Therefore, it is highly likely that the Commission will complete and implement this proposed change.

Total Cost. The projected costs over the five-year grant period to undertake priority program change #2 would total \$868,550.

Program Change #3: Energy and Government Facility Siting

The Commission should improve its program for facilitating the siting of energy facilities and energy-related activities and government activities while maintaining current levels of coastal resource protection through refining its Bay Plan policies, such as by addressing:

- **Airport Planning.** By broadening BCDC’s ongoing work with the Metropolitan Transportation Commission, the Association of Bay Area Governments, the Federal Aviation Administration and local airports to address an apparent future need for expanded airport capacity in the Bay Area, the Commission will ensure that BCDC’s airport policies reflect current information on the aviation industry in the Bay Area, consistent with the RASPA. It is critical that the Bay Plan findings, policies and priority use area designations reflect and respond to these changes in air travel and cargo demands, while protecting Bay natural resources and assuring that, if fill is proposed for airport facilities, the fill is needed, there are no alternative upland locations, and the fill is placed to minimize adverse environmental impacts on the Bay. BCDC can maximize its time and effort in updating the RASPA, either as the lead or as one of the central agencies in RAPC, by updating the Bay Plan airport policies in conjunction with the RASPA work. The update of the Bay Plan policies continues to be important, especially with the changes in aviation industry security and demand since the 2000 RASPA amendment.

Identified as a high priority project in BCDC’s program assessment to address impacts.

Project Objectives. The objectives of the regional airport planning project include the following: (1) assess and characterize recent changes in the aviation industry relative to their impacts on the Bay; (2) update the RASPA; and (3) update the Bay Plan findings, policies, and priority use area designations to reflect and respond to changes in the aviation industry and to be consistent with the RASPA.

General Work Plan

- a. *January—June 2006.* Work with the RAPC to secure funding and develop a strategy for updating the RASPA.

- b. *July—September 2006.* Review existing BCDC airport findings, policies, and priority use area designations and develop a detailed work plan for the Bay Plan policy update. Initiate research on the changes to and needs of the aviation industry in the Bay Area. Work closely with RAPC and stakeholders to ensure that the RASPA update and the update to the Bay Plan are based on a regional strategy for protecting Bay natural resources while meeting the air travel needs of the Bay Area.
- c. *October 2006—March 2007.* Prepare a background report describing the existing conditions. Identify the necessary changes to the Bay Plan that would protect Bay resources and accommodate the aviation industry. Develop a draft of the report findings and language based on analysis of the issues and in close collaboration with RAPC.
- d. *April—June 2007.* Develop the final report findings and language and initiate the Bay Plan amendment process.

Summary of Estimated Costs

Staff time (1.0 personnel years).....	\$170,610
Consultant assistance (cartographer, graphic design, printing).....	\$2,000
Travel... ..	\$1,500
Printing.....	\$2,500
Total project cost.....	\$176,610

Likelihood of Achieving the Program Change. There is a high likelihood of completing and implementing this proposed change. The Commission identified regional airport planning as one of its highest priorities. With the RASPA update scheduled for 2006, the Commission can effectively leverage its limited resources to commence and complete an update to the Bay Plan findings, policies, and priority use area designations in parallel with the RASPA update.

- **Water-Related Industry.** The Commission should improve its program for facilitating the siting of energy facilities and energy-related activities through refining its Bay Plan findings, policies, and priority use area designations pertaining to water-related industry. The Commission can work with the CEC, OSPRA, and the State Lands Commission to assess the specific needs for petroleum infrastructure expansion in the Bay Area and supplement the contents of the CEC's 2007 Integrated Energy Report with this relevant information. Through this partnership, the Commission would benefit from the CEC's expertise in projecting energy demand and supply when updating the findings, policies, and priority use area designations pertaining to water-related industry.

Identified as an Energy and Government Facility Siting program enhancement in BCDC's program assessment to address impacts.

General Work Plan

- a. *October—January 2006.* Working with stakeholders and, potentially, the California Energy Commission Staff, prepare a draft background report and draft preliminary revised findings and policies.
- b. *February—March 2007* Circulate draft report and preliminary findings and policies to Advisory Committee, revise staff background report and findings and policies. Vote on proposed Brief Descriptive Notice for initiation of Bay Plan Amendment.
- c. *May—June 2007.* Prepare final staff background report and preliminary recommendation, mail to Commissioners and interested parties, hold public hearing and vote.

- d. *July—September 2007.* Submit revisions to OAL for approval, submit revisions to Resources Agency and OCRM for approval. Prepare, print and distribute final report with adopted findings and policies.

Summary of Estimated Costs

Staff time (0.5 personnel years).....	\$85,305
Consultant assistance (cartographer, graphic design, printing).....	\$1,000
Travel... ..	\$1,000
Printing.....	<u>\$1,500</u>
Total project cost.....	\$88,805

Likelihood of Achieving the Program Change. Most of the priority use areas designated in the Bay Plan for water-related industry are for petroleum facilities that require a shoreline location for marine terminals to transfer petroleum products from ship to refinery and refinery to ship. Due the increasing demand for petroleum imports in California and the continued pressure to import more petroleum into the San Francisco Bay, there is a growing need to update the Bay Plan policies regarding water-related industry and marine terminals to support this important industry and protect Bay resources by ensuring that adequate acreage is available on the shoreline for petroleum imports. Such an update is likely to receive wide support from the petroleum industry and local governments. Therefore, it is very likely that BCDC would complete and implement this proposed change.

Total Cost. The projected costs over the five-year grant period to undertake priority program change #3 would total \$265,415.

Program Change #4: Cumulative and Secondary Impacts Program

The Commission should develop policies and programs to address impacts to the Bay created by growth and development by building on its successful track record in collaborating with agencies, interest groups and the public to better coordinate and manage planning efforts important to the Bay region. These efforts could be pursued in a number of ways, including:

- **Water Surface Area and Volume.** As part of its effort to develop and implement a comprehensive program that addresses cumulative and secondary impacts of growth and development, the Commission should update the Bay Plan findings and policies pertaining to water surface area and volume. The water surface area and volume findings and policies need to be updated to: (1) incorporate new information about the important relationships between water surface area and volume, water circulation, fresh water inflow, bathymetry, and water pollution (2) recognize the potential impacts of global climate change on the chemical and hydrological functions of water surface area and volume; and (3) provide clear policy guidance for the extensive areas of the Bay planned for restoration.

Identified as a Cumulative and Secondary Impacts program enhancement in BCDC's program assessment to address impacts.

General Work Plan

- a. *July—September 2007.* Prepare a draft background report and draft preliminary revised findings and policies.
- b. *October—December 2007.* Circulate draft report and preliminary findings and policies to Advisory Committee, revise staff background report and findings and policies. Vote on proposed Brief Descriptive Notice for initiation of Bay Plan Amendment.
- c. *January—March 2008.* Prepare final staff background report and preliminary recommendation, mail to Commissioners and interested parties, hold public hearing and vote.

- d. *April—June 2008.* Submit revisions to OAL for approval, submit revisions to Resources Agency and OCRM for approval. Prepare, print and distribute final report with adopted findings and policies.

Summary of Estimated Costs

Staff time (0.7 personnel years).....	\$119,427
Consultant assistance (cartographer, graphic design, printing).....	\$1,000
Travel... ..	\$1,000
Printing.....	\$1,500
Total project cost.....	\$122,927

Likelihood of Achieving the Program Change. There is a high likelihood of completing and implementing this proposed change. At the time that BCDC was created, a large percent of the original surface area of the Bay had been diked off or filled. However, the Bay Plan policies on Water Surface Area and Volume are now out of date, having never been updated. There is new scientific information about the important relationships between water surface area and volume, water circulation, fresh water inflow, bathymetry, and water pollution. There is a great need to update the policies on water, surface area, and volume so that BCDC can continue to effectively achieve one of its primary mandates.

- **Fresh Water Inflow.** As part of its effort to develop and implement a comprehensive program that addresses cumulative and secondary impacts of growth and development, the Commission should update the Bay Plan policies on fresh water inflow. The Bay Plan policies on fresh water inflow have not been updated since 1982, long before the CALFED process was initiated. Because the amount of fresh water that enters the Bay through tributaries affects the overall species composition and geomorphology of the Bay, there is a need to evaluate the fresh water inflow policies in the Bay Plan and develop a work program to update the findings and policies to: (1) incorporate new information about the role of fresh water in the Bay; (2) incorporate new information about the impacts of global climate change on fresh water supply and potential diversions; and (3) to analyze and address recent CALFED decisions and initiatives and incorporate information pertaining to BCDC's jurisdiction.

Identified as a Cumulative and Secondary Impacts program enhancement in BCDC's program assessment to address impacts.

General Work Plan

- a. *October—December 2006.* Prepare a draft background report and draft preliminary revised findings and policies.
- b. *January—March 2007* Circulate draft report and preliminary findings and policies to Advisory Committee, revise staff background report and findings and policies. Vote on proposed Brief Descriptive Notice for initiation of Bay Plan Amendment.
- c. *April—June 2007.* Prepare final staff background report and preliminary recommendation, mail to Commissioners and interested parties, hold public hearing and vote.
- d. *July—September 2007.* Submit revisions to OAL for approval, submit revisions to Resources Agency and OCRM for approval. Prepare, print and distribute final report with adopted findings and policies.

Summary of Estimated Costs

Staff time (0.5 personnel years).....	\$85,305
Consultant assistance (cartographer, graphic design, printing).....	\$1,000
Travel.....	\$1,000
Printing.....	\$1,500
Total project cost.....	\$88,805

Likelihood of Achieving the Program Change. There is a high likelihood of completing and implementing this proposed change. The CALFED process has yielded new scientific information about the impacts of upstream water diversion from the Bay as well as a number of directives and initiatives that must be incorporated into the Bay Plan. The Commission has wide support from CALFED to incorporate its directives as well as from San Francisco Bay stakeholders for updating this section of the Bay Plan.

- **Invasive Species.** The Bay is considered the “most invaded Estuary in the world.” The cumulative impacts of introduced invasive species are the primary threat to the Bay’s biodiversity, with new species introduced at a rate of one every twelve weeks. BCDC should further improve its program by addressing the cumulative and secondary impacts of growth and development by updating the Bay Plan findings and policies pertaining to invasive species. BCDC should develop an invasive species program that includes the following: (1) analyzing the existing invasive species programs of other organizations to determine how BCDC can best assist in the effort to stop the introduction of invasive species; (2) analyzing the Bay Plan policies pertaining to invasive species and potentially developing new Bay Plan policies; and (3) developing a coordinated approach to advocating and providing education on invasive species issues.

Identified as a Cumulative and Secondary Impacts program enhancement in BCDC’s program assessment to address impacts.

General Work Plan

- a. *July—September 2010.* Develop a working group to analyzing the existing invasive species programs and determine how BCDC can best assist in the effort to stop the introduction of invasive species. If revised findings and policies are needed, prepare a draft background report and draft preliminary revised findings and policies.
- b. *October—December 2010.* Circulate draft report and preliminary findings and policies to Advisory Committee, revise staff background report and findings and policies. Vote on proposed Brief Descriptive Notice for initiation of Bay Plan Amendment.
- c. *January—March 2011.* Prepare final staff background report and preliminary recommendation, mail to Commissioners and interested parties, hold public hearing and vote.
- d. *April—June 2011.* Submit revisions to OAL for approval, submit revisions to Resources Agency and OCRM for approval. Prepare, print and distribute final report with adopted findings and policies.

Summary of Estimated Costs

Staff time (0.5 personnel years).....	\$85,305
Consultant assistance (cartographer, graphic design, printing).....	\$1,000
Travel.....	\$1,000
Printing.....	\$1,500
Total project cost.....	\$88,805

Likelihood of Achieving the Program Change. Two reports on the state of the Bay indicate that there is wide regional support to address the issue of invasive species. There are two mechanisms for identifying and reporting on San Francisco Bay resource issues. Both the Bay Institute and the San Francisco Estuary Project issue “report cards” on the state of Bay where issues are identified, prioritized and progress in dealing issues is tracked. The report cards are developed with input from stakeholders around the Bay-Delta and both of the most recent report cards list invasive species as one of the issues with the greatest impact on the Bay and the least progress in addressing. Therefore, it is highly likely that this proposed program change will be completed and implemented.

- **Data Systems and Performance Indicators.** The Commission can further improve its program on cumulative and secondary impacts of growth and development by merging two data systems—PTS and BayRAT—to provide 40 years of detailed permit data in a GIS and enable the Commission to generate data in response to NOAA’s performance indicator requirement. Merging PTS and BayRAT would require additional input of past permit actions and minor modifications. Additional modifications, although minor, would also be required to generate data for performance measures. However, the data generated from a combined data system would not only be useful for NOAA’s performance indicator program, but for securing state general funds and support for BCDC’s program from the state legislature.

Identified as a potential Cumulative and Secondary Impacts program enhancement in BCDC’s program assessment to respond to NOAA requirements for future funding.

Project Objectives. The objectives of the data system and performance indicator project include the following: (1) merge the PTS and BayRAT systems into one comprehensive spatial and text-based system that can be used on a daily basis by the BCDC staff on project-related matters and to report on NOAA’s performance indicators as well as to generate program support at the state level; (2) make minor modifications to respond to specific performance indicators; and (3) update all data entry in the comprehensive system.

General Work Plan

- November—December 2006.* Develop a detailed work plan and identify specific changes to the data systems to improve reporting on performance indicators.
- January—February 2007.* Make minor system changes and combine the PTS and BayRAT data systems.
- March--May 2007.* Hire and supervise an intern to enter all permit data that is not yet in the comprehensive data system.
- June 2007.* Generate performance indicator reports.

Summary of Estimated Costs

Staff time (2.5 personnel years).....	\$41,652
Consultant assistance (cartographer, graphic design, printing).....	\$103,348
Software.....	\$5,000
Total project cost.....	\$150,000

Likelihood of Achieving the Program Change. There is a high likelihood of completing and implementing this proposed change. Since, NOAA is requiring states with certified coastal management programs to report on performance indicators in order to receive CZMA funding, BCDC may have no choice but to complete and implement this proposed program change.

Total Cost. The projected costs over the five-year grant period to undertake priority program change #4 would total \$450,537.

Program Change #5: Public Access Program

To further its program to improve public access to the Bay, the Commission should explore ways to increase public access and refine its policies related to public access, through such avenues as:

- **The Shoreline Landscape Guide.** The Commission should improve its public access program by updating Shoreline Landscape Guide to include a comprehensive set of planting guidelines that address the numerous shoreline settings that are present along the San Francisco Bay. The original guide was created in 1984 with financial assistance from OCRM. Since the plan was created, new information has emerged and important trends have evolved. Depending on the situation and location, effective shoreline landscaping can contribute to attractive public access trail experiences, can minimize adverse effects of public access on wildlife through the use of design techniques such as landscape buffers, and can create upland habitat for wildlife. The Commission should update the Shoreline Landscape Guide to include the following: (1) a revised list of appropriate shoreline plants for various situations, with an emphasis on natives; (2) an up-to-date list of plant sources; and (3) planting principles for the zone between tidal areas and adjacent development.

Carried over as a public access program enhancement identified in BCDC's 2000 Assessment and Strategy.

General Work Plan

- a. *January–March 2006.* Form Technical Advisory Committee (TAC), outline and complete research for revised Guide. Obtain consultant services for Guide graphics. Develop draft Guide.
- b. *April–June 2006.* Revise draft Guide with TAC, revise Guide and circulate for comments. Prepare final landscape guide and print.

Summary of Estimated Costs

Staff time (.25 personnel year)	\$42,653
Consultant assistance (cartographer, graphic design, printing).....	<u>30,000</u>
Total project cost.....	\$72,653

Likelihood of Achieving the Program Change. There is a high likelihood of completing and implementing this proposed change. There is a great interest in revision of the document both within BCDC and from other agencies and members of the public. The revision of the Landscape Guide would succeed in advancing research concerning appropriate and ecologically sensitive commercial shoreline landscaping. Additionally, the revised guide would continue to be a fundamental part of the ongoing educational program that is required when working within the regulatory framework. By updating this educational and technical document, the relationship between commercial shoreline landscaping and its impact on wildlife value and the shoreline ecosystem will be better understood and managed.

Total Cost. The projected costs over the five-year grant period to undertake priority program change #5 would total \$72,653.

Program Change #6: Special Area Management Planning

The Commission can build on its proven success in joining with local jurisdictions and others to foster greater coordination in developing policies and land use planning for the Bay and shoreline through such special area planning programs as:

- **Suisun Marsh Planning.** The Suisun Resource Conservation District (SRCD) and the Commission want to update the duck club management plans to reflect current duck club management practices in the marsh and to create a comprehensive GIS data base that describes all water control structures and other improvements on the clubs. Such improvements will improve communications between the clubs and the SRCD and between the SRCD and the Commission. The Commission will ensure that the new plans include current best management practices, and will conserve plant, fish and wildlife species in the marsh, consistent with the requirements of the Suisun Marsh Preservation Act, and the Suisun Marsh Preservation Plan.

Identified as a program enhancement in BCDC's program assessment to address impacts.

General Work Plan

- a. *October 2006—March 2007.* Working with the SRCD, develop a work detailed work plan and schedule for completing the plan updates for Commission review.
- b. *April—September 2007.* Review plans and write background report for a Commission public hearing and vote.

Summary of Estimated Costs

Staff time (0.4 personnel years).....	\$68,244
Travel... ..	\$2,000
Total project cost.....	\$70,244

Likelihood of Achieving the Program Change. The SRCD has already received funding for and commenced work on the updates to duck club management plans and has recently begun coordinating with Commission staff. Therefore, it is highly likely that this proposed program change will be completed and implemented.

Carried over as Special Area Management Planning program enhancement identified in BCDC's 2000 Assessment and Strategy.

- **San Francisco Southern Waterfront.** BCDC and the Port of San Francisco need to plan for potential development impacts that will affect the southern waterfront. The 2000 amendments to the San Francisco Waterfront Special Area Plan provide an excellent example of a successful collaborative planning process between the Port and BCDC that has reduced conflicts and improved project review and policy implementation. BCDC and the Port should continue their partnership by updating the policies pertaining to the area south of China Basin, which features the City's remaining maritime cargo shipping facilities, and is currently facing proposals for non-maritime mixed use development.

General Work Plan

- a. *October—December 2009.* Work with the Port of San Francisco to develop a working group that will analyze the existing San Francisco Waterfront Special Area Plan elements that address the southern waterfront. Determine how the plan can be updated to address southern waterfront issues. If revised findings and policies are needed, prepare a draft background report and draft preliminary revised findings and policies.

- b. *January—March 2010.* Circulate draft report and preliminary findings and policies to Advisory Committee, revise staff background report and findings and policies. Vote on proposed Brief Descriptive Notice for initiation of Bay Plan Amendment.
- c. *April—June 2010.* Prepare final staff background report and preliminary recommendation, mail to Commissioners and interested parties, hold public hearing and vote.
- d. *July—September 2010.* Submit revisions to OAL for approval, submit revisions to Resources Agency and OCRM for approval. Prepare, print and distribute final report with adopted findings and policies.

Summary of Estimated Costs

Staff time (0.5 personnel years).....	\$85,305
Consultant assistance (cartographer, graphic design, printing).....	\$2,500
Printing.....	<u>\$2,500</u>
Total project cost.....	\$90,305

Likelihood of Achieving the Program Change. With support from the Port of San Francisco and the southern waterfront community, there is a high likelihood of completing and implementing this proposed change.

Total Cost. The projected costs over the five-year grant period to undertake priority program change #6 would total \$160,549.

Table 14. Budget Summary

Program Improvements	FY 06-07	FY 07-08	FY 08-09	FY 09-10	FY 10-11	Total
Wetlands Program						\$503,769
Subtidal Habitat	\$85,305	\$85,305	\$85,305	\$94,305		\$350,220
Managed Wetlands	\$68,244					\$68,244
Science Integration	\$85,305					\$85,305
Coastal Hazards Program						\$868,550
Climate Change	\$85,305	\$127,957	\$127,957	\$96,806		\$438,025
Disaster Preparedness			\$170,610	\$170,610	\$89,305	\$430,525
Energy and Government Facilities						\$265,415
Regional Airport Planning	\$85,305	\$91,305				\$176,610
Water-related Industry	\$71,744	\$17,061				\$88,805
Cumulative & Secondary Impacts						\$450,537
Water Surface & Volume	\$68,244	\$54,683				\$122,927
Fresh Water Inflow		\$34,122	\$54,683			\$88,805
PTS/BayRAT Merge	\$150,000					\$150,000
Invasive Species				\$34,122	\$54,683	\$88,805
Public Access						\$72,653
Shoreline Landscape Guide	\$72,653					\$72,653
Special Area Management						\$160,549
Suisun Management Plans	\$35,122	\$35,122				\$70,244
San Francisco So. Waterfront				\$25,591	\$64,714	\$90,305
Total Costs						\$2,321,473